Ameren Illinois Energy Efficiency Market Potential Assessment

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MARKET PROFILES

Market profiles describe electricity use by sector, segment, end use and technology in the base year of the study (2011). The market profiles are given for average buildings and new vintages.

As explained in Chapter 2 of Volume 3, a market profile includes the following elements:

- **Market size** is a representation of the number of customers in the segment. For the residential sector, it is number of households. In the commercial sector, it is floor space measured in square feet. For the industrial sector, it is number of employees.
- **Saturations** define the fraction of buildings with the specific technologies. (e.g., homes with electric space heating)
- **UEC (unit energy consumption) or EUI (energy-use index)** describes the amount of energy consumed in the base year by a specific technology in buildings that have the technology. We use UECs expressed in kWh/household for the residential sector, and EUIs expressed in kWh/square foot or kWh/employee for the commercial and industrial sectors respectively.
- **Intensity** for the residential sector represents the average energy use for the technology across all households in the base year. It is computed as the product of the saturation and the UEC and is defined as kWh/household for electricity. For the commercial and industrial sectors, intensity, computed as the product of the saturation and the EUI, represents the average use for the technology across all floor space or all employees in the base year.
- **Usage** is the annual energy use by a technology/end use in the segment. It is the product of the market size and intensity and is quantified in GWh for electricity.

This appendix presents the following market profiles:

- Residential market profiles by segment (Table A-1 through Table A-6)
- Commercial market profiles by building type (Table A-7 through Table A-26)
- Industrial market profiles (Table A-27 through Table A-36)

Table A-1 Residential Single Family Electric Customer Only Market Profile, 2011

		Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Central AC	71%	2,688	1,916.3	660.0	81%	2,173	1,766.8	-19.1%
Cooling	Room AC	14%	1,051	151.4	52.1	4%	938	41.3	-10.8%
Cooling	Air-Source Heat Pump	6%	2,199	137.5	47.4	6%	1,519	95.0	-30.9%
Cooling	Geothermal Heat Pump	5%	1,952	88.8	30.6	5%	1,304	59.3	-33.2%
Cooling	PTHP	0%	1,051	-	-	0%	1,051	-	0.0%
Heating	Electric Room Heat	3%	12,009	359.3	123.7	3%	12,009	359.3	0.0%
Heating	Furnace	10%	12,609	1,231.1	424.0	10%	12,609	1,231.1	0.0%
Heating	Air-Source Heat Pump	5%	8,571	422.0	145.3	5%	6,096	300.2	-28.9%
Heating	Geothermal Heat Pump	4%	4,899	175.4	60.4	4%	4,794	171.6	-2.1%
Heating	PTHP	0%	1,007	-	-	0%	1,007	-	0.0%
Water Heating	Water Heater <= 55 gal	22%	2,695	596.3	205.4	22%	2,591	573.2	-3.9%
Water Heating	Water Heater > 55 gal	13%	2,873	367.0	126.4	13%	2,761	352.7	-3.9%
Interior Lighting	Screw-in	100%	1,140	1,139.7	392.5	100%	1,136	1,135.9	-0.3%
Interior Lighting	Linear Fluorescent	100%	142	142.5	49.1	100%	139	139.3	-2.2%
Interior Lighting	Specialty	100%	301	300.7	103.6	100%	298	297.8	-1.0%
Exterior Lighting	Screw-in	100%	247	247.3	85.2	100%	201	201.0	-18.7%
Appliances	Refrigerator	98%	718	702.5	241.9	98%	433	423.3	-39.7%
Appliances	Second Refrigerator	35%	837	289.5	99.7	35%	504	174.4	-39.7%
Appliances	Freezer	58%	572	329.0	113.3	58%	464	266.9	-18.9%
Appliances	Clothes Washer	96%	95	90.8	31.3	96%	78	74.1	-18.4%
Appliances	Clothes Dryer	68%	731	495.3	170.6	68%	506	343.0	-30.8%
Appliances	Dishwasher	72%	395	285.1	98.2	72%	216	155.6	-45.4%
Appliances	Stove	58%	449	262.5	90.4	58%	450	262.5	0.0%
Appliances	Microwave	98%	118	115.5	39.8	98%	118	115.5	0.0%
Electronics	Personal Computers	79%	249	196.9	67.8	79%	259	204.2	3.8%
Electronics	Monitor	79%	50	39.2	13.5	79%	49	38.6	-1.4%
Electronics	Laptops	108%	107	115.9	39.9	108%	103	111.1	-4.2%
Electronics	TVs	301%	203	609.9	210.0	301%	136	409.7	-32.8%
Electronics	Printer/Fax/Copier	100%	38	38.1	13.1	100%	34	33.9	-11.0%
Electronics	Set-top Boxes/DVR	253%	129	325.7	112.2	253%	103	261.1	-19.8%
Electronics	Devices and Gadgets	100%	95	95.0	32.7	100%	95	95.0	0.0%
Miscellaneous	Air Purifier/Cleaner	11%	1,160	125.3	43.1	11%	1,160	125.3	0.0%
Miscellaneous	Dehumidifier	36%	1,809	656.7	226.1	36%	1,379	500.6	-23.8%
Miscellaneous	Pool Heater	7%	4,732	324.1	111.6	7%	4,117	282.0	-13.0%
Miscellaneous	Pool Pump	12%	1,425	163.9	56.4	12%	1,425	163.9	0.0%
Miscellaneous	Hot Tub / Spa	2%	903	19.9	6.8	2%	903	19.9	0.0%
Miscellaneous	Well Pump	12%	533	66.3	22.8	12%	533	66.3	0.0%
Miscellaneous	Furnace Fan	100%	501	500.6	172.4	100%	500	499.7	-0.2%
Miscellaneous	Bathroom Exhaust Fan	33%	134	43.9	15.1	33%	100	32.5	-25.8%
Miscellaneous	Miscellaneous	100%	379	378.8	130.4	100%	379	378.8	0.0%
	Total			**13,545.3**	**4,665.0**			**11,762.5**	**-13.2%**

Table A-2 Multi Family Electric Customer Only Market Profile, 2011

		Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Central AC	66%	790	518.4	86.4	76%	624	471.8	-21.0%
Cooling	Room AC	27%	331	88.2	14.7	17%	295	49.2	-10.8%
Cooling	Air-Source Heat Pump	0%	616	-	-	0%	427	-	-30.7%
Cooling	Geothermal Heat Pump	0%	511	-	-	0%	455	-	-10.9%
Cooling	PTHP	0%	331	-	-	0%	331	-	0.0%
Heating	Electric Room Heat	14%	3,032	417.8	69.6	14%	3,032	417.8	0.0%
Heating	Furnace	28%	3,184	879.9	146.6	28%	3,184	879.9	0.0%
Heating	Air-Source Heat Pump	0%	2,923	-	-	0%	2,087	-	-28.6%
Heating	Geothermal Heat Pump	0%	2,191	-	-	0%	2,037	-	-7.0%
Heating	PTHP	0%	352	-	-	0%	352	-	0.0%
Water Heating	Water Heater <= 55 gal	79%	1,719	1,352.2	225.2	79%	1,654	1,301.1	-3.8%
Water Heating	Water Heater > 55 gal	4%	1,832	64.8	10.8	4%	1,763	62.3	-3.8%
Interior Lighting	Screw-in	100%	799	799.0	133.1	100%	791	791.1	-1.0%
Interior Lighting	Linear Fluorescent	100%	63	63.1	10.5	100%	63	62.9	-0.3%
Interior Lighting	Specialty	100%	211	210.8	35.1	100%	211	211.2	0.2%
Exterior Lighting	Screw-in	100%	108	107.6	17.9	100%	90	90.3	-16.1%
Appliances	Refrigerator	96%	718	687.9	114.6	96%	433	414.5	-39.7%
Appliances	Second Refrigerator	10%	836	81.1	13.5	10%	504	48.9	-39.7%
Appliances	Freezer	16%	572	93.2	15.5	16%	464	75.6	-18.9%
Appliances	Clothes Washer	46%	95	44.0	7.3	46%	77	35.9	-18.4%
Appliances	Clothes Dryer	89%	649	577.3	96.2	89%	450	399.9	-30.7%
Appliances	Dishwasher	33%	395	130.5	21.7	33%	216	71.2	-45.4%
Appliances	Stove	84%	433	363.9	60.6	84%	433	364.0	0.0%
Appliances	Microwave	95%	118	112.5	18.7	95%	118	112.5	0.0%
Electronics	Personal Computers	39%	249	97.2	16.2	39%	259	100.8	3.8%
Electronics	Monitor	39%	50	19.3	3.2	39%	49	19.1	-1.4%
Electronics	Laptops	92%	107	98.8	16.5	92%	103	94.6	-4.2%
Electronics	TVs	190%	203	385.0	64.1	190%	136	258.6	-32.8%
Electronics	Printer/Fax/Copier	52%	38	19.7	3.3	52%	34	17.6	-11.0%
Electronics	Set-top Boxes/DVR	163%	129	209.8	35.0	163%	103	168.2	-19.8%
Electronics	Devices and Gadgets	100%	95	95.0	15.8	100%	95	95.0	0.0%
Miscellaneous	Air Purifier/Cleaner	9%	1,160	107.9	18.0	9%	1,160	107.9	0.0%
Miscellaneous	Dehumidifier	10%	1,809	188.1	31.3	10%	1,379	143.4	-23.8%
Miscellaneous	Pool Heater	1%	4,732	47.3	7.9	1%	4,117	41.2	-13.0%
Miscellaneous	Pool Pump	1%	1,425	14.3	2.4	1%	1,425	14.3	0.0%
Miscellaneous	Hot Tub / Spa	0%	903	-	-	0%	903	-	0.0%
Miscellaneous	Well Pump	0%	528	-	-	0%	528	-	0.0%
Miscellaneous	Furnace Fan	91%	260	236.7	39.4	91%	259	236.2	-0.2%
Miscellaneous	Bathroom Exhaust Fan	12%	134	16.5	2.7	12%	100	12.2	-25.8%
Miscellaneous	Miscellaneous	100%	233	233.3	38.9	100%	233	233.3	0.0%
	Total			**8,361.1**	**1,392.8**			**7,402.6**	**-11.5%**

Table A-3 Residential Single Family Electric/Gas Customer Market Profile 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Central AC	84%	2,540	2,130.8	970.6	94%	2,054	1,928.3	-19.1%
Cooling	Room AC	14%	993	140.0	63.8	4%	886	36.3	-10.8%
Cooling	Air-Source Heat Pump	1%	2,078	15.6	7.1	1%	1,435	10.8	-30.9%
Cooling	Geothermal Heat Pump	1%	1,845	10.1	4.6	1%	1,232	6.7	-33.2%
Cooling	PTHP	0%	993	-	-	0%	993	-	0.0%
Heating	Electric Room Heat	0%	11,889	14.3	6.5	0%	11,889	14.3	0.0%
Heating	Furnace	2%	12,483	272.1	124.0	2%	12,483	272.1	0.0%
Heating	Air-Source Heat Pump	0%	8,485	12.8	5.8	0%	6,035	9.1	-28.9%
Heating	Geothermal Heat Pump	0%	4,850	5.3	2.4	0%	4,746	5.2	-2.1%
Heating	PTHP	0%	997	-	-	0%	997	-	0.0%
Water Heating	Water Heater <= 55 gal	9%	2,695	238.0	108.4	9%	2,591	228.7	-3.9%
Water Heating	Water Heater > 55 gal	2%	2,873	59.5	27.1	2%	2,761	57.2	-3.9%
Interior Lighting	Screw-in	100%	1,140	1,139.7	519.1	100%	1,136	1,135.8	-0.3%
Interior Lighting	Linear Fluorescent	100%	142	142.5	64.9	100%	139	139.2	-2.3%
Interior Lighting	Specialty	100%	301	300.7	137.0	100%	298	298.1	-0.9%
Exterior Lighting	Screw-in	100%	247	247.3	112.6	100%	265	264.7	7.0%
Appliances	Refrigerator	99%	718	707.5	322.3	99%	463	456.5	-35.5%
Appliances	Second Refrigerator	30%	837	249.3	113.6	30%	540	160.9	-35.5%
Appliances	Freezer	47%	572	268.4	122.2	47%	464	217.7	-18.9%
Appliances	Clothes Washer	96%	95	91.3	41.6	96%	85	81.4	-10.8%
Appliances	Clothes Dryer	67%	731	486.6	221.6	67%	506	336.9	-30.8%
Appliances	Dishwasher	67%	395	264.5	120.5	67%	257	171.9	-35.0%
Appliances	Stove	53%	449	239.6	109.1	53%	450	239.6	0.0%
Appliances	Microwave	98%	118	115.5	52.6	98%	118	115.5	0.0%
Electronics	Personal Computers	81%	249	201.8	91.9	81%	249	201.4	-0.2%
Electronics	Monitor	81%	50	40.2	18.3	81%	48	39.0	-2.9%
Electronics	Laptops	99%	107	106.3	48.4	99%	107	106.1	-0.2%
Electronics	TVs	286%	203	579.5	264.0	286%	170	486.9	-16.0%
Electronics	Printer/Fax/Copier	100%	38	38.1	17.3	100%	36	36.3	-4.5%
Electronics	Set-top Boxes/DVR	260%	129	334.7	152.4	260%	127	329.6	-1.5%
Electronics	Devices and Gadgets	100%	95	95.0	43.3	100%	95	95.0	0.0%
Miscellaneous	Air Purifier/Cleaner	10%	1,160	119.5	54.4	10%	1,160	119.5	0.0%
Miscellaneous	Dehumidifier	33%	1,809	595.1	271.1	33%	1,379	453.7	-23.8%
Miscellaneous	Pool Heater	4%	4,732	178.9	81.5	4%	4,117	155.6	-13.0%
Miscellaneous	Pool Pump	5%	1,425	77.0	35.1	5%	1,425	77.0	0.0%
Miscellaneous	Hot Tub / Spa	3%	903	29.8	13.6	3%	903	29.8	0.0%
Miscellaneous	Well Pump	12%	533	66.3	30.2	12%	533	66.3	0.0%
Miscellaneous	Furnace Fan	91%	501	457.2	208.3	91%	500	456.4	-0.2%
Miscellaneous	Bathroom Exhaust Fan	39%	134	52.3	23.8	39%	134	52.3	0.0%
Miscellaneous	Miscellaneous	100%	353	353.5	161.0	100%	353	353.5	0.0%
	Total			**10,476.4**	**4,772.1**			**9,245.4**	**-11.8%**

Natural Gas Average Market Profile						New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Heating	Furnace	89%	543	484.0	220.5	89%	484	431.5	-10.9%
Heating	Boiler	9%	738	69.4	31.6	9%	388	36.5	-47.4%
Heating	Other Heating	2%	427	9.0	4.1	2%	427	9.0	0.0%
Water Heating	Water Heater <= 55 gal	73%	192	139.4	63.5	73%	175	127.0	-8.9%
Water Heating	Water Heater > 55 gal	16%	203	33.3	15.2	16%	185	30.4	-8.9%
Appliances	Clothes Dryer	33%	27	9.0	4.1	33%	16	5.2	-42.7%
Appliances	Stove	46%	55	25.6	11.6	46%	52	24.1	-5.6%
Miscellaneous	Pool Heater	11%	154	17.1	7.8	11%	154	17.1	0.0%
Miscellaneous	Hot Tub / Spa	0%	52	-	-	0%	52	-	0.0%
Miscellaneous	Miscellaneous	100%	31	31.2	14.2	100%	31	31.2	0.0%
	Total			**818.0**	**372.6**			**711.9**	**-13.0%**

Table A-4 Multi Family Electric/Gas Customer Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Central AC	83%	1,778	1,474.0	140.5	93%	1,404	1,304.5	-21.0%
Cooling	Room AC	12%	744	90.7	8.6	2%	663	14.6	-10.8%
Cooling	Air-Source Heat Pump	0%	1,386	-	-	0%	960	-	-30.7%
Cooling	Geothermal Heat Pump	0%	1,150	-	-	0%	1,024	-	-10.9%
Cooling	PTHP	0%	744	-	-	0%	744	-	0.0%
Heating	Electric Room Heat	0%	6,064	-	-	0%	6,064	-	0.0%
Heating	Furnace	3%	6,367	193.6	18.4	3%	6,367	193.6	0.0%
Heating	Air-Source Heat Pump	0%	5,846	-	-	0%	4,174	-	-28.6%
Heating	Geothermal Heat Pump	0%	4,381	-	-	0%	4,073	-	-7.0%
Heating	PTHP	0%	703	-	-	0%	703	-	0.0%
Water Heating	Water Heater <= 55 gal	9%	2,629	243.7	23.2	9%	2,530	234.5	-3.8%
Water Heating	Water Heater > 55 gal	5%	2,802	129.7	12.4	5%	2,696	124.8	-3.8%
Interior Lighting	Screw-in	100%	925	925.1	88.2	100%	918	918.4	-0.7%
Interior Lighting	Linear Fluorescent	100%	63	63.1	6.0	100%	64	63.8	1.2%
Interior Lighting	Specialty	100%	244	244.1	23.3	100%	243	243.1	-0.4%
Exterior Lighting	Screw-in	100%	125	124.6	11.9	100%	124	124.1	-0.4%
Appliances	Refrigerator	100%	718	718.0	68.4	100%	463	463.2	-35.5%
Appliances	Second Refrigerator	13%	836	107.1	10.2	13%	540	69.1	-35.5%
Appliances	Freezer	26%	572	145.8	13.9	26%	464	118.3	-18.9%
Appliances	Clothes Washer	92%	95	86.8	8.3	92%	85	77.4	-10.8%
Appliances	Clothes Dryer	83%	649	538.3	51.3	83%	450	372.9	-30.7%
Appliances	Dishwasher	53%	395	210.3	20.0	53%	257	136.7	-35.0%
Appliances	Stove	60%	433	261.7	24.9	60%	433	261.7	0.0%
Appliances	Microwave	95%	118	112.5	10.7	95%	118	112.5	0.0%
Electronics	Personal Computers	73%	249	181.9	17.3	73%	249	181.5	-0.2%
Electronics	Monitor	73%	50	36.2	3.4	73%	48	35.2	-2.9%
Electronics	Laptops	91%	107	97.7	9.3	91%	107	97.5	-0.2%
Electronics	TVs	249%	203	504.5	48.1	249%	170	423.9	-16.0%
Electronics	Printer/Fax/Copier	52%	38	19.7	1.9	52%	36	18.9	-4.5%
Electronics	Set-top Boxes/DVR	293%	129	377.1	35.9	293%	127	371.4	-1.5%
Electronics	Devices and Gadgets	100%	95	95.0	9.1	100%	95	95.0	0.0%
Miscellaneous	Air Purifier/Cleaner	6%	1,160	74.2	7.1	6%	1,160	74.2	0.0%
Miscellaneous	Dehumidifier	13%	1,809	231.5	22.1	13%	1,379	176.5	-23.8%
Miscellaneous	Pool Heater	2%	4,732	99.4	9.5	2%	4,117	86.5	-13.0%
Miscellaneous	Pool Pump	2%	1,425	29.9	2.9	2%	1,425	29.9	0.0%
Miscellaneous	Hot Tub / Spa	0%	903	-	-	0%	903	-	0.0%
Miscellaneous	Well Pump	0%	528	-	-	0%	528	-	0.0%
Miscellaneous	Furnace Fan	83%	260	216.2	20.6	83%	259	215.8	-0.2%
Miscellaneous	Bathroom Exhaust Fan	13%	134	17.3	1.6	13%	134	17.3	0.0%
Miscellaneous	Miscellaneous	100%	194	193.8	18.5	100%	194	193.8	0.0%
	Total			**7,843.9**	**747.4**			**6,850.9**	**-12.7%**

Natural Gas Average Market Profile						New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	80%	413	331.4	31.6	80%	373	299.4	-9.7%
Heating	Boiler	5%	576	29.5	2.8	5%	309	15.8	-46.3%
Heating	Other Heating	0%	198	-	-	0%	198	-	0.0%
Water Heating	Water Heater <= 55 gal	75%	140	105.6	10.1	75%	129	97.2	-8.0%
Water Heating	Water Heater > 55 gal	11%	149	16.0	1.5	11%	137	14.7	-8.0%
Appliances	Clothes Dryer	15%	21	3.1	0.3	15%	12	1.8	-42.7%
Appliances	Stove	40%	55	21.8	2.1	40%	52	20.6	-5.6%
Miscellaneous	Pool Heater	0%	54	-	-	0%	54	-	0.0%
Miscellaneous	Hot Tub / Spa	0%	52	-	-	0%	52	-	0.0%
Miscellaneous	Miscellaneous	100%	17	16.7	1.6	100%	17	16.7	0.0%
	Total			**524.2**	**50.0**			**466.3**	**-11.1%**

Table A-5 Single Family Gas Only Customer Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	90%	501	452.1	82.0	90%	447	403.1	-10.9%
Heating	Boiler	8%	681	52.7	9.6	8%	358	27.7	-47.4%
Heating	Other Heating	5%	394	18.9	3.4	5%	394	18.9	0.0%
Water Heating	Water Heater <= 55 gal	59%	177	105.0	19.1	59%	161	95.7	-8.9%
Water Heating	Water Heater > 55 gal	27%	188	51.0	9.2	27%	171	46.4	-8.9%
Appliances	Clothes Dryer	36%	27	9.8	1.8	36%	16	5.6	-42.7%
Appliances	Stove	49%	55	27.1	4.9	49%	52	25.6	-5.6%
Miscellaneous	Pool Heater	13%	154	19.3	3.5	13%	154	19.3	0.0%
Miscellaneous	Hot Tub / Spa	0%	52	-	-	0%	52	-	0.0%
Miscellaneous	Miscellaneous	100%	30	30.0	5.4	100%	30	30.0	0.0%
	Total			**766.0**	**138.9**			**672.4**	**-12.2%**

Table A-6 Multi Family Gas Customer Only Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	85%	349	296.7	4.2	85%	315	268.0	-9.7%
Heating	Boiler	6%	486	31.4	0.4	6%	261	16.9	-46.3%
Heating	Other Heating	0%	167	-	-	0%	167	-	0.0%
Water Heating	Water Heater <= 55 gal	100%	124	123.7	1.8	100%	114	113.8	-8.0%
Water Heating	Water Heater > 55 gal	0%	131	-	-	0%	121	-	-8.0%
Appliances	Clothes Dryer	33%	21	7.1	0.1	33%	12	4.1	-42.7%
Appliances	Stove	29%	55	15.8	0.2	29%	52	14.9	-5.6%
Miscellaneous	Pool Heater	0%	54	-	-	0%	54	-	0.0%
Miscellaneous	Hot Tub / Spa	0%	52	-	-	0%	52	-	0.0%
Miscellaneous	Miscellaneous	100%	16	16.2	0.2	100%	16	16.2	0.0%
	Total			**490.9**	**7.0**			**433.9**	**-11.6%**

Table A-7 Commercial Electric Customer - Office Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	4%	3.40	0.12	18.42	4%	3.00	0.11	-11.7%
Cooling	Water-Cooled Chiller	1%	3.28	0.02	3.24	1%	1.69	0.01	-48.4%
Cooling	Roof top AC	74%	3.31	2.45	374.46	74%	2.42	1.79	-26.9%
Cooling	Air Source Heat Pump	0%	3.34	-	-	0%	2.92	-	-12.5%
Cooling	Geothermal Heat Pump	0%	2.23	-	-	0%	1.49	-	-33.3%
Cooling	PTAC	2%	2.52	0.04	6.47	2%	2.12	0.04	-15.9%
Cooling	PTHP	2%	2.52	0.05	7.67	2%	2.12	0.04	-15.9%
Cooling	Evaporative AC	0%	2.48	-	-	0%	2.48	-	0.0%
Heating	Air Source Heat Pump	0%	2.35	-	-	0%	2.03	-	-13.7%
Heating	Geothermal Heat Pump	0%	1.57	-	-	0%	1.23	-	-21.3%
Heating	Electric Room Heat	1%	3.44	0.03	4.70	1%	3.44	0.03	0.0%
Heating	Electric Furnace	21%	3.61	0.74	113.63	21%	3.61	0.74	0.0%
Heating	PTAC	2%	1.72	0.03	4.41	2%	1.72	0.03	0.0%
Heating	PTHP	2%	1.37	0.03	4.19	2%	1.36	0.03	-1.2%
Ventilation	Ventilation	100%	1.92	1.92	292.58	100%	1.79	1.79	-6.8%
Water Heating	Water Heating	54%	0.64	0.34	52.24	54%	0.62	0.33	-2.9%
Interior Lighting	Screw-in	100%	0.40	0.40	61.52	100%	0.43	0.43	5.8%
Interior Lighting	High-Bay Fixtures	100%	0.18	0.18	27.72	100%	0.15	0.15	-15.7%
Interior Lighting	Linear Fluorescent	100%	2.68	2.68	408.91	100%	2.12	2.12	-21.1%
Exterior Lighting	Screw-in	100%	0.07	0.07	10.77	100%	0.07	0.07	1.1%
Exterior Lighting	HID	100%	0.31	0.31	47.70	100%	0.17	0.17	-45.4%
Exterior Lighting	Linear Fluorescent	100%	0.02	0.02	3.13	100%	0.02	0.02	-23.9%
Refrigeration	Walk-in Refrigerator	1%	-	-	-	1%	-	-	0.0%
Refrigeration	Reach-in Refrigerator	8%	0.04	0.00	0.45	8%	0.01	0.00	-61.7%
Refrigeration	Glass Door Display	45%	0.15	0.07	10.12	45%	0.12	0.05	-19.1%
Refrigeration	Open Display Case	45%	0.07	0.03	4.57	45%	0.05	0.02	-19.8%
Refrigeration	Icemaker	45%	0.04	0.02	2.78	45%	0.04	0.02	-11.4%
Refrigeration	Vending Machine	45%	0.07	0.03	4.96	45%	0.05	0.02	-37.7%
Food Prep.	Oven	0%	1.50	-	-	0%	1.40	-	-6.9%
Food Prep.	Fryer	0%	2.23	-	-	0%	2.22	-	-0.7%
Food Prep.	Dishwasher	3%	3.44	0.11	16.69	3%	2.90	0.09	-15.8%
Food Prep.	Hot Food Container	0%	0.98	-	-	0%	0.59	-	-39.9%
Food Prep.	Other	0%	0.62	-	-	0%	0.58	-	-6.2%
Office Equip.	Desktop Computer	98%	1.69	1.65	252.26	98%	1.68	1.64	-0.7%
Office Equip.	Laptop	93%	0.26	0.24	37.04	93%	0.26	0.24	-0.7%
Office Equip.	Server	98%	0.20	0.20	29.83	98%	0.19	0.19	-4.7%
Office Equip.	Monitor	100%	0.31	0.31	47.67	100%	0.30	0.30	-2.8%
Office Equip.	Printer/Copier/Fax	100%	0.13	0.13	20.56	100%	0.15	0.15	13.8%
Office Equip.	POS Terminal	35%	0.01	0.00	0.59	35%	0.01	0.00	-15.6%
Miscellaneous	Non-HVAC Motors	90%	0.14	0.13	19.74	90%	0.15	0.13	0.4%
Miscellaneous	Pool Pump	0%	0.02	-	-	0%	0.02	-	3.1%
Miscellaneous	Miscellaneous	100%	0.48	0.48	73.29	100%	0.48	0.48	0.0%

	Total			12.86	1,962.31			11.24	-12.6%

Table A-8 Commercial Natural Gas Customer -Office Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	82%	0.23	0.19	9.18	82%	0.22	0.18	-4.9%
Heating	Boiler	1%	0.77	0.01	0.26	1%	0.65	0.00	-16.3%
Heating	Unit Heater	2%	0.21	0.00	0.17	2%	0.21	0.00	0.0%
Water Heating	Water Heating	40%	0.10	0.04	1.99	40%	0.10	0.04	-5.6%
Food Prep.	Oven	2%	0.32	0.01	0.25	2%	0.28	0.00	-12.5%
Food Prep.	Fryer	2%	0.49	0.01	0.37	2%	0.56	0.01	13.6%
Food Prep.	Broiler	0%	0.50	-	-	0%	0.44	-	-11.8%
Food Prep.	Griddle	2%	0.37	0.01	0.28	2%	0.37	0.01	-0.3%
Food Prep.	Range	2%	0.36	0.01	0.28	2%	0.33	0.01	-8.2%
Food Prep.	Steamer	0%	0.58	-	-	0%	0.51	-	-10.8%
Food Prep.	Other	0%	0.15	-	-	0%	0.15	-	-1.7%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	7%	0.16	0.01	0.54	7%	0.16	0.01	0.0%
	Total			0.28	13.32			0.26	-4.5%

Table A-9 Commercial Electric Customer - Restaurant Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	1%	7.63	0.04	1.42	1%	7.26	0.04	-4.8%
Cooling	Water-Cooled Chiller	0%	8.01	-	-	0%	5.17	-	-35.5%
Cooling	Roof top AC	87%	5.95	5.17	166.78	87%	4.35	3.78	-26.9%
Cooling	Air Source Heat Pump	2%	7.72	0.19	6.19	2%	5.90	0.15	-23.6%
Cooling	Geothermal Heat Pump	2%	5.15	0.08	2.63	2%	2.18	0.03	-57.7%
Cooling	PTAC	3%	4.53	0.15	5.00	3%	3.67	0.13	-19.1%
Cooling	PTHP	1%	4.53	0.04	1.40	1%	3.67	0.04	-19.1%
Cooling	Evaporative AC	0%	4.46	-	-	0%	4.46	-	0.0%
Heating	Air Source Heat Pump	2%	4.56	0.11	3.66	2%	3.87	0.10	-15.2%
Heating	Geothermal Heat Pump	2%	3.04	0.05	1.56	2%	1.98	0.03	-34.8%
Heating	Electric Room Heat	0%	5.91	-	-	0%	5.91	-	0.0%
Heating	Electric Furnace	8%	6.20	0.52	16.78	8%	6.20	0.52	0.0%
Heating	PTAC	3%	2.95	0.10	3.26	3%	2.95	0.10	0.0%
Heating	PTHP	1%	2.36	0.02	0.73	1%	2.26	0.02	-4.4%
Ventilation	Ventilation	100%	1.97	1.97	63.38	100%	1.59	1.59	-19.3%
Water Heating	Water Heating	44%	6.98	3.10	100.08	44%	6.83	3.03	-2.3%
Interior Lighting	Screw-in	100%	2.14	2.14	68.91	100%	1.61	1.61	-24.8%
Interior Lighting	High-Bay Fixtures	100%	1.11	1.11	35.93	100%	0.87	0.87	-21.9%
Interior Lighting	Linear Fluorescent	100%	2.84	2.84	91.70	100%	2.10	2.10	-26.3%
Exterior Lighting	Screw-in	100%	0.16	0.16	5.00	100%	0.14	0.14	-8.8%
Exterior Lighting	HID	100%	1.60	1.60	51.65	100%	1.15	1.15	-28.4%
Exterior Lighting	Linear Fluorescent	100%	0.01	0.01	0.17	100%	0.00	0.00	-28.9%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Refrigeration	Walk-in Refrigerator	24%	5.14	1.25	40.45	24%	2.27	0.55	-55.8%
Refrigeration	Reach-in Refrigerator	16%	0.79	0.13	4.08	16%	0.30	0.05	-61.7%
Refrigeration	Glass Door Display	97%	3.32	3.23	104.06	97%	2.68	2.61	-19.1%
Refrigeration	Open Display Case	97%	1.50	1.46	46.98	97%	1.20	1.17	-19.8%
Refrigeration	Icemaker	97%	0.91	0.89	28.58	97%	0.81	0.79	-11.4%
Refrigeration	Vending Machine	97%	0.81	0.79	25.48	97%	0.50	0.49	-38.6%
Food Prep	Oven	10%	6.29	0.64	20.48	10%	5.85	0.59	-6.9%
Food Prep	Fryer	13%	9.37	1.19	38.40	13%	9.30	1.18	-0.7%
Food Prep	Dishwasher	41%	7.20	2.93	94.51	41%	6.07	2.47	-15.8%
Food Prep	Hot Food Container	19%	2.06	0.39	12.46	19%	1.24	0.23	-39.9%
Food Prep	Other	0%	1.29	-	-	0%	1.21	-	-6.3%
Office Equip.	Desktop Computer	76%	0.26	0.20	6.45	76%	0.26	0.20	-0.7%
Office Equip.	Laptop	55%	0.03	0.02	0.58	55%	0.03	0.02	-0.7%
Office Equip.	Server	55%	0.37	0.20	6.59	55%	0.36	0.19	-4.7%
Office Equip.	Monitor	75%	0.05	0.04	1.18	75%	0.05	0.04	-2.8%
Office Equip.	Printer/Copier/Fax	45%	0.05	0.02	0.73	45%	0.06	0.03	13.8%
Office Equip.	POS Terminal	83%	0.10	0.08	2.72	83%	0.09	0.07	-15.6%
Miscellaneous	Non-HVAC Motors	20%	0.23	0.05	1.49	20%	0.23	0.05	0.4%
Miscellaneous	Pool Pump	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	100%	1.00	1.00	32.27	100%	1.00	1.00	0.0%
	Total			**33.93**	**1,093.70**			**27.14**	**-20.0%**

Table A-10 Commercial Natural Gas Customer - Restaurant Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	92%	0.25	0.23	3.88	92%	0.24	0.22	-4.9%
Heating	Boiler	0%	0.65	0.00	0.05	0%	0.59	0.00	-9.0%
Heating	Unit Heater	1%	0.23	0.00	0.03	1%	0.23	0.00	0.0%
Water Heating	Water Heating	89%	0.37	0.33	5.57	89%	0.36	0.32	-5.0%
Food Prep.	Oven	13%	0.17	0.02	0.37	13%	0.15	0.02	-12.5%
Food Prep.	Fryer	90%	0.26	0.23	3.89	90%	0.29	0.26	13.6%
Food Prep.	Broiler	77%	0.26	0.20	3.40	77%	0.23	0.18	-11.8%
Food Prep.	Griddle	88%	0.20	0.17	2.89	88%	0.20	0.17	-0.3%
Food Prep.	Range	81%	0.19	0.16	2.61	81%	0.18	0.14	-8.2%
Food Prep.	Steamer	6%	0.30	0.02	0.29	6%	0.27	0.02	-10.8%
Food Prep.	Other	0%	0.04	0.00	0.00	0%	0.04	0.00	-1.7%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	8%	0.22	0.02	0.28	8%	0.22	0.02	0.0%
	Total			**1.39**	**23.27**			**1.35**	**-2.8%**

Table A-11 Commercial Electric Customer - Retail Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	0%	2.54	-	-	0%	2.47	-	-2.8%
Cooling	Water-Cooled Chiller	0%	2.45	0.00	0.09	0%	1.58	0.00	-35.5%
Cooling	Roof top AC	35%	3.87	1.34	207.77	35%	2.83	0.98	-26.9%
Cooling	Air Source Heat Pump	1%	3.91	0.04	6.60	1%	2.99	0.03	-23.6%
Cooling	Geothermal Heat Pump	0%	2.61	0.01	1.55	0%	1.74	0.01	-33.3%
Cooling	PTAC	3%	2.94	0.09	13.25	3%	2.47	0.07	-16.1%
Cooling	PTHP	0%	2.94	0.01	1.10	0%	2.47	0.01	-16.1%
Cooling	Evaporative AC	0%	2.90	-	-	0%	2.90	-	0.0%
Heating	Air Source Heat Pump	1%	3.94	0.04	6.65	1%	3.78	0.04	-4.0%
Heating	Geothermal Heat Pump	0%	2.62	0.01	1.56	0%	2.20	0.01	-16.3%
Heating	Electric Room Heat	2%	5.76	0.11	17.08	2%	5.76	0.11	0.0%
Heating	Electric Furnace	4%	6.04	0.26	39.72	4%	6.04	0.26	0.0%
Heating	PTAC	3%	2.88	0.08	12.95	3%	2.88	0.08	0.0%
Heating	PTHP	0%	2.30	0.01	0.86	0%	2.27	0.01	-1.4%
Ventilation	Ventilation	100%	0.94	0.94	145.36	100%	0.92	0.92	-1.9%
Water Heating	Water Heating	59%	0.76	0.45	69.67	59%	0.74	0.44	-2.4%
Interior Lighting	Screw-in	100%	0.30	0.30	46.49	100%	0.20	0.20	-32.1%
Interior Lighting	High-Bay Fixtures	100%	0.14	0.14	21.59	100%	0.14	0.14	1.9%
Interior Lighting	Linear Fluorescent	100%	4.37	4.37	676.74	100%	3.33	3.33	-23.8%
Exterior Lighting	Screw-in	100%	0.49	0.49	75.68	100%	0.24	0.24	-51.6%
Exterior Lighting	HID	100%	0.27	0.27	42.27	100%	0.19	0.19	-30.7%
Exterior Lighting	Linear Fluorescent	100%	0.01	0.01	0.81	100%	0.00	0.00	-26.5%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Refrigeration	Walk-in Refrigerator	0%	0.67	-	-	0%	0.30	-	-55.8%
Refrigeration	Reach-in Refrigerator	29%	0.10	0.03	4.70	29%	0.04	0.01	-61.7%
Refrigeration	Glass Door Display	52%	0.43	0.23	35.10	52%	0.35	0.18	-19.1%
Refrigeration	Open Display Case	52%	0.20	0.10	15.84	52%	0.16	0.08	-19.8%
Refrigeration	Icemaker	52%	0.24	0.12	19.28	52%	0.21	0.11	-11.4%
Refrigeration	Vending Machine	52%	0.21	0.11	17.19	52%	0.13	0.07	-38.6%
Food Prep	Oven	4%	0.67	0.03	4.02	4%	0.62	0.02	-6.9%
Food Prep	Fryer	2%	0.99	0.02	3.83	2%	0.98	0.02	-0.7%
Food Prep	Dishwasher	12%	1.53	0.18	27.32	12%	1.29	0.15	-15.8%
Food Prep	Hot Food Container	0%	0.44	-	-	0%	0.26	-	-39.9%
Food Prep	Other	0%	0.27	-	-	0%	0.26	-	-6.2%
Office Equip.	Desktop Computer	94%	0.15	0.14	22.00	94%	0.15	0.14	-0.7%
Office Equip.	Laptop	79%	0.02	0.02	2.88	79%	0.02	0.02	-0.7%
Office Equip.	Server	78%	0.21	0.17	26.08	78%	0.20	0.16	-4.7%
Office Equip.	Monitor	94%	0.03	0.03	4.07	94%	0.03	0.03	-2.8%
Office Equip.	Printer/Copier/Fax	85%	0.01	0.01	1.92	85%	0.02	0.01	13.8%
Office Equip.	POS Terminal	82%	0.06	0.05	7.38	82%	0.05	0.04	-15.6%
Miscellaneous	Non-HVAC Motors	40%	0.29	0.12	18.11	40%	0.29	0.12	0.4%
Miscellaneous	Pool Pump	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	100%	0.40	0.40	61.92	100%	0.40	0.40	0.0%
	Total			**10.72**	**1,659.44**			**8.64**	**-19.4%**

Table A-12 Commercial Natural Gas Customer - Retail Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	84%	0.32	0.27	22.04	84%	0.31	0.26	-3.8%
Heating	Boiler	5%	0.61	0.03	2.26	5%	0.54	0.02	-11.4%
Heating	Unit Heater	8%	0.29	0.02	1.83	8%	0.29	0.02	0.0%
Water Heating	Water Heating	29%	0.14	0.04	3.32	29%	0.13	0.04	-5.6%
Food Prep.	Oven	0%	0.97	0.00	0.26	0%	0.85	0.00	-12.5%
Food Prep.	Fryer	0%	1.48	0.00	0.40	0%	1.68	0.01	13.6%
Food Prep.	Broiler	0%	1.51	-	-	0%	1.33	-	-11.8%
Food Prep.	Griddle	0%	1.13	-	-	0%	1.12	-	-0.3%
Food Prep.	Range	0%	1.10	-	-	0%	1.01	-	-8.2%
Food Prep.	Steamer	0%	1.74	-	-	0%	1.55	-	-10.8%
Food Prep.	Other	0%	0.47	-	-	0%	0.46	-	-1.7%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	7%	0.12	0.01	0.67	7%	0.12	0.01	0.0%
	Total			**0.38**	**30.78**			**0.36**	**-4.1%**

Table A-13 Commercial Electric Customer – Grocery Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	0%	5.36	-	-	0%	5.10	-	-4.8%
Cooling	Water-Cooled Chiller	0%	5.17	-	-	0%	3.34	-	-35.5%
Cooling	Roof top AC	74%	8.17	6.09	103.43	74%	5.97	4.45	-26.9%
Cooling	Air Source Heat Pump	1%	8.20	0.11	1.90	1%	6.27	0.09	-23.6%
Cooling	Geothermal Heat Pump	0%	5.47	-	-	0%	3.64	-	-33.4%
Cooling	PTAC	0%	6.22	-	-	0%	5.03	-	-19.1%
Cooling	PTHP	5%	6.22	0.28	4.81	5%	5.03	0.23	-19.1%
Cooling	Evaporative AC	0%	6.13	-	-	0%	6.13	-	0.0%
Heating	Air Source Heat Pump	1%	6.41	0.09	1.49	1%	6.04	0.08	-5.8%
Heating	Geothermal Heat Pump	0%	4.28	-	-	0%	3.60	-	-16.0%
Heating	Electric Room Heat	0%	6.72	-	-	0%	6.72	-	0.0%
Heating	Electric Furnace	40%	7.05	2.84	48.24	40%	7.05	2.84	0.0%
Heating	PTAC	0%	3.36	-	-	0%	3.36	-	0.0%
Heating	PTHP	5%	2.69	0.12	2.08	5%	2.57	0.12	-4.5%
Ventilation	Ventilation	100%	2.34	2.34	39.75	100%	1.91	1.91	-18.4%
Water Heating	Water Heating	27%	2.45	0.66	11.20	27%	2.43	0.65	-1.1%
Interior Lighting	Screw-in	100%	0.77	0.77	13.15	100%	0.43	0.43	-43.9%
Interior Lighting	High-Bay Fixtures	100%	0.11	0.11	1.82	100%	0.10	0.10	-4.6%
Interior Lighting	Linear Fluorescent	100%	8.81	8.81	149.66	100%	7.22	7.22	-18.0%
Exterior Lighting	Screw-in	100%	0.28	0.28	4.73	100%	0.11	0.11	-60.5%
Exterior Lighting	HID	100%	0.96	0.96	16.38	100%	0.48	0.48	-49.7%
Exterior Lighting	Linear Fluorescent	100%	0.04	0.04	0.66	100%	0.03	0.03	-20.9%
Refrigeration	Walk-in Refrigerator	17%	9.03	1.50	25.48	17%	3.99	0.66	-55.8%
Refrigeration	Reach-in Refrigerator	7%	0.40	0.03	0.45	7%	0.15	0.01	-61.7%
Refrigeration	Glass Door Display	99%	16.65	16.47	279.96	99%	13.47	13.32	-19.1%
Refrigeration	Open Display Case	99%	7.52	7.44	126.38	99%	6.03	5.96	-19.8%
Refrigeration	Icemaker	99%	0.23	0.23	3.85	99%	0.20	0.20	-11.3%
Refrigeration	Vending Machine	99%	0.41	0.40	6.86	99%	0.25	0.25	-38.0%
Food Prep	Oven	28%	0.69	0.20	3.34	28%	0.65	0.18	-6.9%
Food Prep	Fryer	28%	1.03	0.29	4.97	28%	1.03	0.29	-0.7%
Food Prep	Dishwasher	22%	1.59	0.36	6.05	22%	1.34	0.30	-15.8%
Food Prep	Hot Food Container	69%	0.45	0.31	5.31	69%	0.27	0.19	-39.9%
Food Prep	Other	3%	0.28	0.01	0.16	3%	0.27	0.01	-6.3%
Office Equip.	Desktop Computer	96%	0.17	0.16	2.72	96%	0.17	0.16	-0.7%
Office Equip.	Laptop	66%	0.03	0.02	0.29	66%	0.03	0.02	-0.7%
Office Equip.	Server	66%	0.12	0.08	1.34	66%	0.11	0.08	-4.7%
Office Equip.	Monitor	94%	0.03	0.03	0.50	94%	0.03	0.03	-2.8%
Office Equip.	Printer/Copier/Fax	100%	0.02	0.02	0.27	100%	0.02	0.02	13.8%
Office Equip.	POS Terminal	100%	0.08	0.08	1.37	100%	0.07	0.07	-15.6%
Miscellaneous	Non-HVAC Motors	35%	0.45	0.15	2.63	35%	0.45	0.16	0.4%
Miscellaneous	Pool Pump	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	100%	1.00	1.00	17.04	100%	1.00	1.00	0.0%
	Total			**52.26**	**888.24**			**41.64**	**-20.3%**

Table A-14 Commercial Natural Gas Customer - Grocery Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	100%	0.29	0.29	2.37	100%	0.27	0.27	-4.9%
Heating	Boiler	0%	0.55	-	-	0%	0.49	-	-10.4%
Heating	Unit Heater	0%	0.26	-	-	0%	0.26	-	0.0%
Water Heating	Water Heating	96%	0.13	0.13	1.03	96%	0.12	0.12	-5.5%
Food Prep.	Oven	29%	0.04	0.01	0.09	29%	0.03	0.01	-12.5%
Food Prep.	Fryer	29%	0.06	0.02	0.13	29%	0.06	0.02	13.6%
Food Prep.	Broiler	0%	0.06	-	-	0%	0.05	-	-11.8%
Food Prep.	Griddle	29%	0.04	0.01	0.10	29%	0.04	0.01	-0.3%
Food Prep.	Range	29%	0.04	0.01	0.10	29%	0.04	0.01	-8.2%
Food Prep.	Steamer	0%	0.06	-	-	0%	0.06	-	-10.8%
Food Prep.	Other	0%	0.02	-	-	0%	0.02	-	-1.7%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	3%	0.04	0.00	0.01	3%	0.04	0.00	0.0%
	Total			**0.46**	**3.82**			**0.44**	**-4.6%**

Table A-15 Commercial Electric Customer - College Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	19%	4.23	0.81	92.94	19%	3.59	0.69	-15.1%
Cooling	Water-Cooled Chiller	61%	4.08	2.47	283.29	61%	2.64	1.60	-35.3%
Cooling	Roof top AC	11%	2.98	0.34	38.72	11%	2.18	0.25	-26.9%
Cooling	Air Source Heat Pump	0%	2.54	-	-	0%	1.94	-	-23.6%
Cooling	Geothermal Heat Pump	0%	1.69	-	-	0%	1.13	-	-33.3%
Cooling	PTAC	4%	2.27	0.09	10.08	4%	1.91	0.07	-15.9%
Cooling	PTHP	0%	2.27	-	-	0%	1.91	-	-15.9%
Cooling	Evaporative AC	0%	2.24	-	-	0%	2.24	-	0.0%
Heating	Air Source Heat Pump	0%	10.28	-	-	0%	7.66	-	-25.5%
Heating	Geothermal Heat Pump	0%	6.86	-	-	0%	5.68	-	-17.2%
Heating	Electric Room Heat	0%	15.04	-	-	0%	15.04	-	0.0%
Heating	Electric Furnace	0%	15.79	-	-	0%	15.79	-	0.0%
Heating	PTAC	4%	7.52	0.29	33.40	4%	7.52	0.29	0.0%
Heating	PTHP	0%	6.01	-	-	0%	5.94	-	-1.2%
Ventilation	Ventilation	100%	1.20	1.20	137.10	100%	0.88	0.88	-26.8%
Water Heating	Water Heating	12%	1.63	0.20	22.91	12%	1.62	0.20	-1.1%
Interior Lighting	Screw-in	100%	0.29	0.29	33.55	100%	0.29	0.29	-1.1%
Interior Lighting	High-Bay Fixtures	100%	0.32	0.32	36.98	100%	0.26	0.26	-19.0%
Interior Lighting	Linear Fluorescent	100%	3.61	3.61	413.67	100%	3.23	3.23	-10.7%
Exterior Lighting	Screw-in	100%	0.11	0.11	13.10	100%	0.15	0.15	35.0%
Exterior Lighting	HID	100%	0.57	0.57	64.91	100%	0.35	0.35	-38.7%
Exterior Lighting	Linear Fluorescent	100%	0.00	0.00	0.10	100%	0.00	0.00	-13.9%
Refrigeration	Walk-in Refrigerator	2%	0.25	0.01	0.72	2%	0.11	0.00	-55.8%
Refrigeration	Reach-in Refrigerator	13%	0.08	0.01	1.18	13%	0.03	0.00	-61.7%

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Refrigeration	Glass Door Display	27%	0.16	0.04	4.97	27%	0.13	0.04	-19.1%
Refrigeration	Open Display Case	27%	0.07	0.02	2.24	27%	0.06	0.02	-19.8%
Refrigeration	Icemaker	27%	0.09	0.02	2.73	27%	0.08	0.02	-11.4%
Refrigeration	Vending Machine	27%	0.08	0.02	2.43	27%	0.05	0.01	-37.7%
Food Prep	Oven	49%	0.05	0.03	2.90	49%	0.05	0.02	-6.9%
Food Prep	Fryer	49%	0.08	0.04	4.32	49%	0.08	0.04	-0.7%
Food Prep	Dishwasher	55%	0.12	0.07	7.49	55%	0.10	0.06	-15.8%
Food Prep	Hot Food Container	54%	0.03	0.02	2.11	54%	0.02	0.01	-39.9%
Food Prep	Other	0%	0.02	-	-	0%	0.02	-	-6.3%
Office Equip.	Desktop Computer	100%	0.43	0.43	49.75	100%	0.43	0.43	-0.7%
Office Equip.	Laptop	65%	0.07	0.04	5.02	65%	0.07	0.04	-0.7%
Office Equip.	Server	37%	0.21	0.08	8.73	37%	0.20	0.07	-4.7%
Office Equip.	Monitor	100%	0.08	0.08	9.22	100%	0.08	0.08	-2.8%
Office Equip.	Printer/Copier/Fax	100%	0.07	0.07	7.94	100%	0.08	0.08	13.8%
Office Equip.	POS Terminal	33%	0.07	0.02	2.62	33%	0.06	0.02	-15.6%
Miscellaneous	Non-HVAC Motors	89%	0.06	0.05	5.96	89%	0.06	0.05	0.4%
Miscellaneous	Pool Pump	90%	0.00	0.00	0.20	90%	0.00	0.00	3.1%
Miscellaneous	Pool Heater	36%	0.00	0.00	0.15	36%	0.00	0.00	7.8%
Miscellaneous	Miscellaneous	100%	0.36	0.36	40.69	100%	0.36	0.36	0.0%
	Total			**11.72**	**1,342.09**			**9.61**	**-18.0%**

Table A-16 Commercial Natural Gas Customer - College Market Profile

		Natural Gas Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	64%	0.36	0.23	9.64	64%	0.35	0.22	-4.6%
Heating	Boiler	10%	0.57	0.06	2.28	10%	0.47	0.05	-18.7%
Heating	Unit Heater	0%	0.33	-	-	0%	0.33	-	0.0%
Water Heating	Water Heating	58%	0.19	0.11	4.58	58%	0.18	0.11	-5.1%
Food Prep.	Oven	17%	0.05	0.01	0.35	17%	0.04	0.01	-12.5%
Food Prep.	Fryer	11%	0.08	0.01	0.35	11%	0.09	0.01	13.6%
Food Prep.	Broiler	17%	0.08	0.01	0.55	17%	0.07	0.01	-11.8%
Food Prep.	Griddle	24%	0.06	0.01	0.58	24%	0.06	0.01	-0.3%
Food Prep.	Range	29%	0.06	0.02	0.70	29%	0.05	0.02	-8.2%
Food Prep.	Steamer	10%	0.09	0.01	0.40	10%	0.08	0.01	-10.8%
Food Prep.	Other	1%	0.02	0.00	0.01	1%	0.02	0.00	-1.7%
Miscellaneous	Pool Heater	0%	0.02	-	-	0%	0.02	-	0.0%
Miscellaneous	Miscellaneous	8%	0.19	0.01	0.61	8%	0.19	0.01	0.0%
	Total			**0.49**	**20.05**			**0.46**	**-6.3%**

Table A-17 Commercial Electric Customer - School Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	5%	3.24	0.17	17.83	5%	2.75	0.14	-15.1%
Cooling	Water-Cooled Chiller	5%	3.13	0.15	16.31	5%	2.02	0.10	-35.3%
Cooling	Roof top AC	12%	2.28	0.28	29.97	12%	1.67	0.21	-26.9%
Cooling	Air Source Heat Pump	0%	1.94	-	-	0%	1.49	-	-23.6%
Cooling	Geothermal Heat Pump	2%	1.30	0.03	2.76	2%	0.86	0.02	-33.3%
Cooling	PTAC	2%	1.74	0.04	3.98	2%	1.46	0.03	-15.9%
Cooling	PTHP	0%	1.74	-	-	0%	1.46	-	-15.9%
Cooling	Evaporative AC	0%	1.71	-	-	0%	1.71	-	0.0%
Heating	Air Source Heat Pump	0%	5.92	-	-	0%	4.41	-	-25.5%
Heating	Geothermal Heat Pump	2%	3.95	0.08	8.40	2%	3.27	0.07	-17.2%
Heating	Electric Room Heat	0%	8.66	-	-	0%	8.66	-	0.0%
Heating	Electric Furnace	1%	9.09	0.11	12.14	1%	9.09	0.11	0.0%
Heating	PTAC	2%	4.33	0.09	9.93	2%	4.33	0.09	0.0%
Heating	PTHP	0%	3.46	-	-	0%	3.42	-	-1.2%
Ventilation	Ventilation	100%	0.76	0.76	81.16	100%	0.56	0.56	-26.8%
Water Heating	Water Heating	5%	1.06	0.05	5.77	5%	1.05	0.05	-1.1%
Interior Lighting	Screw-in	100%	0.10	0.10	10.37	100%	0.06	0.06	-40.0%
Interior Lighting	High-Bay Fixtures	100%	0.18	0.18	18.77	100%	0.16	0.16	-11.2%
Interior Lighting	Linear Fluorescent	100%	3.38	3.38	360.65	100%	2.66	2.66	-21.3%
Exterior Lighting	Screw-in	100%	0.07	0.07	7.55	100%	0.05	0.05	-25.3%
Exterior Lighting	HID	100%	0.46	0.46	49.01	100%	0.32	0.32	-31.1%
Exterior Lighting	Linear Fluorescent	100%	0.00	0.00	0.08	100%	0.00	0.00	-24.1%
Refrigeration	Walk-in Refrigerator	20%	0.28	0.06	5.97	20%	0.13	0.02	-55.8%
Refrigeration	Reach-in Refrigerator	21%	0.09	0.02	1.99	21%	0.03	0.01	-61.7%
Refrigeration	Glass Door Display	66%	0.18	0.12	12.87	66%	0.15	0.10	-19.1%
Refrigeration	Open Display Case	66%	0.08	0.05	5.81	66%	0.07	0.04	-19.8%
Refrigeration	Icemaker	66%	0.10	0.07	7.07	66%	0.09	0.06	-11.4%
Refrigeration	Vending Machine	66%	0.09	0.06	6.30	66%	0.06	0.04	-37.7%
Food Prep	Oven	17%	0.14	0.02	2.43	17%	0.13	0.02	-6.9%
Food Prep	Fryer	2%	0.20	0.00	0.34	2%	0.20	0.00	-0.7%
Food Prep	Dishwasher	57%	0.31	0.18	19.08	57%	0.26	0.15	-15.8%
Food Prep	Hot Food Container	26%	0.09	0.02	2.52	26%	0.05	0.01	-39.9%
Food Prep	Other	0%	0.06	-	-	0%	0.05	-	-6.3%
Office Equip.	Desktop Computer	98%	0.19	0.19	20.16	98%	0.19	0.19	-0.7%
Office Equip.	Laptop	96%	0.02	0.02	2.03	96%	0.02	0.02	-0.7%
Office Equip.	Server	96%	0.18	0.18	18.65	96%	0.17	0.17	-4.7%
Office Equip.	Monitor	100%	0.04	0.04	3.80	100%	0.03	0.03	-2.8%
Office Equip.	Printer/Copier/Fax	100%	0.06	0.06	6.54	100%	0.07	0.07	13.8%
Office Equip.	POS Terminal	22%	0.02	0.01	0.57	22%	0.02	0.00	-15.6%
Miscellaneous	Non-HVAC Motors	44%	0.04	0.02	1.87	44%	0.04	0.02	0.4%
Miscellaneous	Pool Pump	8%	0.00	0.00	0.00	8%	0.00	0.00	3.1%
Miscellaneous	Pool Heater	0%	0.00	-	-	0%	0.00	-	7.8%
Miscellaneous	Miscellaneous	100%	0.21	0.21	22.84	100%	0.21	0.21	0.0%
	Total			**7.28**	**775.53**			**5.80**	**-20.3%**

Table A-18 Commercial Natural Gas Customer - School Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	26%	0.16	0.04	4.04	26%	0.16	0.04	-4.6%
Heating	Boiler	47%	0.26	0.12	11.63	47%	0.21	0.10	-18.7%
Heating	Unit Heater	4%	0.15	0.01	0.60	4%	0.15	0.01	0.0%
Water Heating	Water Heating	82%	0.11	0.09	8.37	82%	0.10	0.08	-5.1%
Food Prep.	Oven	45%	0.02	0.01	0.84	45%	0.02	0.01	-12.5%
Food Prep.	Fryer	15%	0.03	0.00	0.41	15%	0.03	0.00	13.6%
Food Prep.	Broiler	32%	0.03	0.01	0.94	32%	0.03	0.01	-11.8%
Food Prep.	Griddle	28%	0.02	0.01	0.60	28%	0.02	0.01	-0.3%
Food Prep.	Range	34%	0.02	0.01	0.71	34%	0.02	0.01	-8.2%
Food Prep.	Steamer	10%	0.03	0.00	0.32	10%	0.03	0.00	-10.8%
Food Prep.	Other	0%	0.01	-	-	0%	0.01	-	-1.7%
Miscellaneous	Pool Heater	8%	0.01	0.00	0.05	8%	0.01	0.00	0.0%
Miscellaneous	Miscellaneous	2%	0.10	0.00	0.22	2%	0.10	0.00	0.0%
	Total			**0.30**	**28.74**			**0.27**	**-10.6%**

Table A-19 Commercial Electric Customer - Health Market Profile, 2011

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	7%	4.94	0.36	29.76	7%	4.36	0.32	-11.7%
Cooling	Water-Cooled Chiller	23%	4.75	1.07	87.63	23%	2.46	0.56	-48.2%
Cooling	Roof top AC	38%	5.86	2.20	179.76	38%	4.29	1.61	-26.9%
Cooling	Air Source Heat Pump	0%	6.08	0.01	0.81	0%	5.32	0.01	-12.5%
Cooling	Geothermal Heat Pump	2%	4.06	0.09	7.13	2%	2.70	0.06	-33.3%
Cooling	PTAC	1%	4.46	0.06	4.60	1%	3.75	0.05	-15.9%
Cooling	PTHP	1%	4.46	0.06	4.60	1%	3.75	0.05	-15.9%
Heating	Air Source Heat Pump	0%	5.26	0.01	0.70	0%	4.07	0.01	-22.6%
Heating	Geothermal Heat Pump	2%	3.51	0.08	6.17	2%	2.98	0.06	-15.1%
Heating	Electric Room Heat	0%	7.69	-	-	0%	7.69	-	0.0%
Heating	Electric Furnace	27%	8.08	2.19	178.57	27%	8.08	2.19	0.0%
Heating	PTAC	1%	3.85	0.05	3.96	1%	3.85	0.05	0.0%
Heating	PTHP	1%	3.08	0.04	3.17	1%	3.04	0.04	-1.2%
Ventilation	Ventilation	100%	2.48	2.48	202.84	100%	1.76	1.76	-29.0%
Water Heating	Water Heating	16%	2.15	0.33	27.34	16%	2.13	0.33	-1.1%
Interior Lighting	Screw-in	100%	0.54	0.54	44.32	100%	0.42	0.42	-22.8%
Interior Lighting	High-Bay Fixtures	100%	0.25	0.25	20.19	100%	0.22	0.22	-11.1%
Interior Lighting	Linear Fluorescent	100%	3.16	3.16	258.03	100%	2.52	2.52	-20.2%
Exterior Lighting	Screw-in	100%	0.03	0.03	2.07	100%	0.01	0.01	-60.5%
Exterior Lighting	HID	100%	0.33	0.33	26.70	100%	0.18	0.18	-44.2%
Exterior Lighting	Linear Fluorescent	100%	0.00	0.00	0.04	100%	0.00	0.00	-23.0%
Refrigeration	Walk-in Refrigerator	8%	0.30	0.02	1.91	8%	0.13	0.01	-55.8%

Refrigeration	Reach-in Refrigerator	8%	0.05	0.00	0.29	8%	0.02	0.00	-61.7%
Refrigeration	Glass Door Display	87%	0.20	0.17	13.99	87%	0.16	0.14	-19.1%
Refrigeration	Open Display Case	87%	0.09	0.08	6.31	87%	0.07	0.06	-19.8%
Refrigeration	Icemaker	87%	0.11	0.09	7.68	87%	0.10	0.08	-11.4%
Refrigeration	Vending Machine	87%	0.10	0.08	6.85	87%	0.06	0.05	-37.7%
Food Prep	Oven	17%	0.45	0.08	6.29	17%	0.42	0.07	-6.9%
Food Prep	Fryer	17%	0.67	0.12	9.41	17%	0.67	0.11	-0.7%
Food Prep	Dishwasher	51%	1.04	0.53	42.97	51%	0.87	0.44	-15.8%
Food Prep	Hot Food Container	12%	0.30	0.04	2.98	12%	0.18	0.02	-39.9%
Food Prep	Other	0%	0.19	0.00	0.03	0%	0.17	0.00	-6.3%
Office Equip.	Desktop Computer	98%	0.32	0.32	25.85	98%	0.32	0.31	-0.7%
Office Equip.	Laptop	73%	0.05	0.04	2.99	73%	0.05	0.04	-0.7%
Office Equip.	Server	90%	0.11	0.10	8.41	90%	0.11	0.10	-4.7%
Office Equip.	Monitor	99%	0.06	0.06	4.86	99%	0.06	0.06	-2.8%
Office Equip.	Printer/Copier/Fax	100%	0.08	0.08	6.31	100%	0.09	0.09	13.8%
Office Equip.	POS Terminal	90%	0.08	0.07	5.69	90%	0.07	0.06	-15.6%
Miscellaneous	Non-HVAC Motors	74%	0.88	0.65	53.34	74%	0.89	0.66	0.4%
Miscellaneous	Pool Pump	0%	0.01	-	-	0%	0.01	-	3.1%
Miscellaneous	Pool Heater	0%	0.02	-	-	0%	0.02	-	7.8%
Miscellaneous	Miscellaneous	100%	2.05	2.05	167.40	100%	2.05	2.05	0.0%
	Total			**17.90**	**1,461.95**			**14.80**	**-17.3%**

Table A-20 Commercial Natural Gas Customer - Health Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	67%	0.55	0.37	15.35	67%	0.53	0.35	-3.8%
Heating	Boiler	3%	1.01	0.03	1.44	3%	0.87	0.03	-13.4%
Heating	Unit Heater	0%	0.49	-	-	0%	0.49	-	0.0%
Water Heating	Water Heating	72%	0.45	0.32	13.43	72%	0.42	0.30	-5.6%
Food Prep.	Oven	4%	0.16	0.01	0.26	4%	0.14	0.01	-12.5%
Food Prep.	Fryer	23%	0.24	0.06	2.33	23%	0.28	0.06	13.6%
Food Prep.	Broiler	5%	0.25	0.01	0.54	5%	0.22	0.01	-11.8%
Food Prep.	Griddle	5%	0.19	0.01	0.40	5%	0.19	0.01	-0.3%
Food Prep.	Range	22%	0.18	0.04	1.65	22%	0.17	0.04	-8.2%
Food Prep.	Steamer	2%	0.29	0.01	0.29	2%	0.26	0.01	-10.8%
Food Prep.	Other	0%	0.08	-	-	0%	0.08	-	-1.7%
Miscellaneous	Pool Heater	0%	0.22	-	-	0%	0.22	-	0.0%
Miscellaneous	Miscellaneous	9%	0.46	0.04	1.79	9%	0.46	0.04	0.0%
	Total			**0.90**	**37.46**			**0.86**	**-3.9%**

Table A-21 Commercial Electric Customer - Lodging Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	0%	0.80	-	-	0%	0.67	-	-16.5%
Cooling	Water-Cooled Chiller	3%	0.77	0.02	1.50	3%	0.44	0.01	-42.9%

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Roof top AC	16%	2.28	0.37	28.14	16%	2.08	0.34	-8.7%
Cooling	Air Source Heat Pump	0%	2.27	-	-	0%	2.17	-	-4.1%
Cooling	Geothermal Heat Pump	0%	1.51	-	-	0%	1.24	-	-18.0%
Cooling	PTAC	36%	1.74	0.63	47.77	36%	1.46	0.53	-15.9%
Cooling	PTHP	34%	1.74	0.59	44.95	34%	1.46	0.50	-15.9%
Cooling	Evaporative AC	0%	1.71	-	-	0%	1.71	-	0.0%
Heating	Air Source Heat Pump	0%	2.54	-	-	0%	2.34	-	-8.0%
Heating	Geothermal Heat Pump	0%	1.70	-	-	0%	1.52	-	-10.3%
Heating	Electric Room Heat	6%	3.72	0.23	17.31	6%	3.72	0.23	0.0%
Heating	Electric Furnace	6%	3.90	0.25	18.62	6%	3.90	0.25	0.0%
Heating	PTAC	36%	1.86	0.67	51.04	36%	1.86	0.67	0.0%
Heating	PTHP	34%	1.49	0.51	38.41	34%	1.47	0.50	-1.2%
Ventilation	Ventilation	100%	0.64	0.64	48.76	100%	0.64	0.64	-0.8%
Water Heating	Water Heating	52%	2.18	1.13	85.66	52%	2.13	1.10	-2.4%
Interior Lighting	Screw-in	100%	1.74	1.74	131.86	100%	1.29	1.29	-25.8%
Interior Lighting	High-Bay Fixtures	100%	0.08	0.08	5.84	100%	0.07	0.07	-9.7%
Interior Lighting	Linear Fluorescent	100%	0.90	0.90	67.85	100%	0.63	0.63	-29.4%
Exterior Lighting	Screw-in	100%	0.13	0.13	9.52	100%	0.12	0.12	-6.7%
Exterior Lighting	HID	100%	0.24	0.24	18.48	100%	0.12	0.12	-51.8%
Exterior Lighting	Linear Fluorescent	100%	0.00	0.00	0.06	100%	0.00	0.00	-31.9%
Refrigeration	Walk-in Refrigerator	13%	0.35	0.05	3.50	13%	0.15	0.02	-55.8%
Refrigeration	Reach-in Refrigerator	13%	0.05	0.01	0.54	13%	0.02	0.00	-61.9%
Refrigeration	Glass Door Display	59%	0.22	0.13	10.02	59%	0.18	0.11	-19.1%
Refrigeration	Open Display Case	59%	0.10	0.06	4.53	59%	0.08	0.05	-19.8%
Refrigeration	Icemaker	59%	0.06	0.04	2.75	59%	0.05	0.03	-11.3%
Refrigeration	Vending Machine	59%	0.11	0.06	4.91	59%	0.06	0.04	-41.9%
Food Prep	Oven	43%	0.06	0.02	1.79	43%	0.05	0.02	-6.9%
Food Prep	Fryer	13%	0.08	0.01	0.82	13%	0.08	0.01	-0.7%
Food Prep	Dishwasher	91%	0.13	0.12	8.72	91%	0.11	0.10	-15.8%
Food Prep	Hot Food Container	0%	0.04	-	-	0%	0.02	-	-39.9%
Food Prep	Other	0%	0.02	-	-	0%	0.02	-	-6.2%
Office Equip.	Desktop Computer	93%	0.05	0.04	3.34	93%	0.05	0.04	-0.7%
Office Equip.	Laptop	78%	0.01	0.01	0.43	78%	0.01	0.01	-0.7%
Office Equip.	Server	84%	0.03	0.03	2.14	84%	0.03	0.03	-4.7%
Office Equip.	Monitor	91%	0.01	0.01	0.61	91%	0.01	0.01	-2.8%
Office Equip.	Printer/Copier/Fax	91%	0.00	0.00	0.31	91%	0.01	0.00	13.8%
Office Equip.	POS Terminal	75%	0.00	0.00	0.26	75%	0.00	0.00	-15.6%
Miscellaneous	Non-HVAC Motors	91%	0.07	0.06	4.55	91%	0.07	0.06	0.4%
Miscellaneous	Pool Pump	51%	0.01	0.00	0.25	51%	0.01	0.00	3.1%
Miscellaneous	Pool Heater	4%	0.01	0.00	0.03	4%	0.01	0.00	7.8%
Miscellaneous	Miscellaneous	100%	0.47	0.47	35.42	100%	0.47	0.47	0.0%
	Total			**9.26**	**700.71**			**8.01**	**-13.5%**

Table A-22 Commercial Natural Gas Customer - Lodging Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Usage (MMTherms)**	**Saturation**	**UEC (therm)**	**Intensity (therm/HH)**	**Compared to Average**
Heating	Furnace	20%	0.18	0.04	0.45	20%	0.17	0.03	-4.9%
Heating	Boiler	24%	0.26	0.06	0.76	24%	0.24	0.06	-8.0%
Heating	Unit Heater	2%	0.16	0.00	0.04	2%	0.16	0.00	0.0%
Water Heating	Water Heating	78%	0.25	0.20	2.45	78%	0.24	0.19	-5.6%
Food Prep.	Oven	25%	0.05	0.01	0.14	25%	0.04	0.01	-12.5%
Food Prep.	Fryer	10%	0.07	0.01	0.08	10%	0.08	0.01	13.6%
Food Prep.	Broiler	10%	0.07	0.01	0.09	10%	0.06	0.01	-11.8%
Food Prep.	Griddle	25%	0.05	0.01	0.17	25%	0.05	0.01	-0.3%
Food Prep.	Range	0%	0.05	0.00	0.00	0%	0.05	0.00	-8.2%
Food Prep.	Steamer	0%	0.08	0.00	0.00	0%	0.07	0.00	-10.8%
Food Prep.	Other	0%	0.02	-	-	0%	0.02	-	-1.7%
Miscellaneous	Pool Heater	41%	0.01	0.00	0.04	41%	0.01	0.00	0.0%
Miscellaneous	Miscellaneous	3%	0.07	0.00	0.03	3%	0.07	0.00	0.0%
	Total			**0.34**	**4.26**			**0.32**	**-5.6%**

Table A-23 Commercial Electric Customer - Warehouse Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	0%	1.81	-	-	0%	1.67	-	-7.8%
Cooling	Water-Cooled Chiller	0%	1.75	-	-	0%	1.13	-	-35.5%
Cooling	Roof top AC	5%	2.76	0.13	16.74	5%	2.02	0.10	-26.9%
Cooling	Air Source Heat Pump	0%	2.79	0.00	0.21	0%	2.44	0.00	-12.6%
Cooling	Geothermal Heat Pump	4%	1.86	0.07	8.61	4%	1.24	0.05	-33.3%
Cooling	PTAC	0%	2.10	-	-	0%	1.77	-	-15.9%
Cooling	PTHP	0%	2.10	-	-	0%	1.77	-	-15.9%
Cooling	Evaporative AC	0%	2.07	-	-	0%	2.07	-	0.0%
Heating	Air Source Heat Pump	0%	5.49	0.00	0.41	0%	5.28	0.00	-3.9%
Heating	Geothermal Heat Pump	4%	3.66	0.14	16.94	4%	3.06	0.11	-16.3%
Heating	Electric Room Heat	0%	8.03	-	-	0%	8.03	-	0.0%
Heating	Electric Furnace	6%	8.43	0.50	62.28	6%	8.43	0.50	0.0%
Heating	PTAC	0%	4.01	-	-	0%	4.01	-	0.0%
Heating	PTHP	0%	3.21	-	-	0%	3.17	-	-1.2%
Ventilation	Ventilation	100%	0.24	0.24	30.36	100%	0.24	0.24	-1.7%
Water Heating	Water Heating	14%	0.22	0.03	3.80	14%	0.22	0.03	-1.1%
Interior Lighting	Screw-in	100%	0.22	0.22	27.11	100%	0.12	0.12	-43.0%
Interior Lighting	High-Bay Fixtures	100%	0.55	0.55	68.19	100%	0.36	0.36	-35.3%
Interior Lighting	Linear Fluorescent	100%	1.35	1.35	167.02	100%	0.96	0.96	-28.4%
Exterior Lighting	Screw-in	100%	0.00	0.00	0.12	100%	0.00	0.00	-52.7%
Exterior Lighting	HID	100%	0.40	0.40	50.09	100%	0.19	0.19	-53.5%
Exterior Lighting	Linear Fluorescent	100%	0.00	0.00	0.01	100%	0.00	0.00	-30.9%
Refrigeration	Walk-in Refrigerator	0%	1.59	-	-	0%	0.70	-	-55.8%
Refrigeration	Reach-in Refrigerator	0%	-	-	-	0%	-	-	0.0%
Refrigeration	Glass Door Display	18%	-	-	-	18%	-	-	0.0%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Refrigeration	Open Display Case	18%	-	-	-	18%	-	-	0.0%
Refrigeration	Icemaker	18%	1.13	0.20	25.16	18%	1.00	0.18	-11.4%
Refrigeration	Vending Machine	18%	1.00	0.18	22.43	18%	0.61	0.11	-39.2%
Food Prep	Oven	0%	0.01	-	-	0%	0.01	-	-6.9%
Food Prep	Fryer	2%	0.01	0.00	0.03	2%	0.01	0.00	-0.7%
Food Prep	Dishwasher	33%	0.02	0.01	0.75	33%	0.02	0.01	-15.8%
Food Prep	Hot Food Container	0%	-	-	-	0%	-	-	0.0%
Food Prep	Other	0%	0.00	-	-	0%	0.00	-	-6.3%
Office Equip.	Desktop Computer	79%	0.09	0.07	8.58	79%	0.09	0.07	-0.7%
Office Equip.	Laptop	37%	0.01	0.00	0.49	37%	0.01	0.00	-0.7%
Office Equip.	Server	65%	0.12	0.08	10.00	65%	0.12	0.08	-4.7%
Office Equip.	Monitor	75%	0.02	0.01	1.50	75%	0.02	0.01	-2.8%
Office Equip.	Printer/Copier/Fax	68%	0.01	0.01	0.70	68%	0.01	0.01	13.8%
Office Equip.	POS Terminal	3%	0.02	0.00	0.07	3%	0.01	0.00	-15.6%
Miscellaneous	Non-HVAC Motors	50%	0.13	0.06	7.88	50%	0.13	0.06	0.4%
Miscellaneous	Miscellaneous	100%	0.16	0.16	19.90	100%	0.16	0.16	0.0%
	Total			**4.43**	**549.39**			**3.36**	**-24.2%**

Table A-24 Commercial Natural Gas Customer - Warehouse Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	0.17	0.07	4.52	44%	0.16	0.07	-3.8%
Heating	Boiler	1%	2.15	0.03	1.76	1%	1.86	0.03	-13.1%
Heating	Unit Heater	24%	0.15	0.04	2.22	24%	0.15	0.04	0.0%
Water Heating	Water Heating	50%	0.03	0.01	0.87	50%	0.03	0.01	-5.6%
Food Prep.	Oven	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Fryer	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Broiler	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Griddle	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Range	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Steamer	0%	-	-	-	0%	-	-	0.0%
Food Prep.	Other	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Pool Heater	0%	-	-	-	0%	-	-	0.0%
Miscellaneous	Miscellaneous	2%	0.04	0.00	0.05	2%	0.04	0.00	0.0%
	Total			**0.15**	**9.42**			**0.15**	**-4.8%**

Table A-25 Commercial Electric Customer - Miscellaneous Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	0%	1.55	-	-	0%	1.31	-	-15.6%
Cooling	Water-Cooled Chiller	2%	1.50	0.03	7.15	2%	0.97	0.02	-35.5%
Cooling	Roof top AC	70%	2.37	1.66	392.08	70%	1.73	1.22	-26.9%
Cooling	Air Source Heat Pump	0%	2.40	-	-	0%	2.10	-	-12.6%
Cooling	Geothermal Heat Pump	1%	1.60	0.01	2.82	1%	1.07	0.01	-33.3%
Cooling	PTAC	2%	1.80	0.04	9.04	2%	1.52	0.03	-15.9%
Cooling	PTHP	2%	1.80	0.04	8.69	2%	1.52	0.03	-15.9%
Cooling	Evaporative AC	0%	1.78	-	-	0%	1.78	-	0.0%
Heating	Air Source Heat Pump	0%	3.01	-	-	0%	2.56	-	-14.9%
Heating	Geothermal Heat Pump	1%	2.01	0.02	3.54	1%	1.56	0.01	-22.2%
Heating	Electric Room Heat	0%	4.40	0.02	5.11	0%	4.40	0.02	0.0%
Heating	Electric Furnace	6%	4.62	0.26	61.72	6%	4.62	0.26	0.0%
Heating	PTAC	2%	2.20	0.05	11.02	2%	2.20	0.05	0.0%
Heating	PTHP	2%	1.76	0.04	8.47	2%	1.74	0.04	-1.2%
Ventilation	Ventilation	100%	0.53	0.53	124.54	100%	0.48	0.48	-8.3%
Water Heating	Water Heating	38%	1.00	0.38	89.98	38%	0.99	0.38	-1.1%
Interior Lighting	Screw-in	100%	0.56	0.56	132.55	100%	0.30	0.30	-46.7%
Interior Lighting	High-Bay Fixtures	100%	0.28	0.28	66.83	100%	0.27	0.27	-3.9%
Interior Lighting	Linear Fluorescent	100%	2.26	2.26	531.97	100%	1.85	1.85	-18.1%
Exterior Lighting	Screw-in	100%	0.23	0.23	54.06	100%	0.16	0.16	-29.5%
Exterior Lighting	HID	100%	0.48	0.48	113.91	100%	0.23	0.23	-52.7%
Exterior Lighting	Linear Fluorescent	100%	0.26	0.26	61.18	100%	0.21	0.21	-21.0%
Refrigeration	Walk-in Refrigerator	15%	0.34	0.05	12.46	15%	0.15	0.02	-55.8%
Refrigeration	Reach-in Refrigerator	15%	0.05	0.01	1.92	15%	0.02	0.00	-61.7%
Refrigeration	Glass Door Display	22%	0.22	0.05	11.27	22%	0.18	0.04	-19.1%
Refrigeration	Open Display Case	22%	0.10	0.02	5.09	22%	0.08	0.02	-19.8%
Refrigeration	Icemaker	22%	0.06	0.01	3.10	22%	0.05	0.01	-11.4%
Refrigeration	Vending Machine	22%	0.11	0.02	5.52	22%	0.07	0.01	-37.9%
Food Prep	Oven	34%	0.06	0.02	5.03	34%	0.06	0.02	-6.9%
Food Prep	Fryer	2%	0.09	0.00	0.55	2%	0.09	0.00	-0.7%
Food Prep	Dishwasher	21%	0.14	0.03	7.00	21%	0.12	0.03	-15.8%
Food Prep	Hot Food Container	10%	0.04	0.00	0.96	10%	0.02	0.00	-39.9%
Food Prep	Other	0%	0.03	-	-	0%	0.02	-	-6.3%
Office Equip.	Desktop Computer	72%	0.24	0.17	40.99	72%	0.24	0.17	-0.7%
Office Equip.	Laptop	57%	0.04	0.02	4.99	57%	0.04	0.02	-0.7%
Office Equip.	Server	44%	0.17	0.07	17.53	44%	0.16	0.07	-4.7%
Office Equip.	Monitor	68%	0.04	0.03	7.17	68%	0.04	0.03	-2.8%
Office Equip.	Printer/Copier/Fax	45%	0.05	0.02	4.93	45%	0.05	0.02	13.8%
Office Equip.	POS Terminal	37%	0.09	0.03	8.06	37%	0.08	0.03	-15.6%
Miscellaneous	Non-HVAC Motors	60%	0.31	0.19	44.37	60%	0.32	0.19	0.4%
Miscellaneous	Pool Pump	80%	0.00	0.00	0.30	80%	0.00	0.00	3.1%
Miscellaneous	Pool Heater	0%	0.00	-	-	0%	0.00	-	7.8%
Miscellaneous	Miscellaneous	100%	0.49	0.49	114.55	100%	0.49	0.49	0.0%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
	Total			**8.41**	**1,980.41**			**6.75**	**-19.7%**

Table A-26 Commercial Natural Gas Customer - Miscellaneous Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	83%	0.14	0.11	19.10	83%	0.14	0.12	1.4%
Heating	Boiler	7%	0.26	0.02	3.24	7%	0.23	0.02	-13.8%
Heating	Unit Heater	0%	0.13	0.00	0.10	0%	0.13	0.00	0.0%
Water Heating	Water Heating	70%	0.07	0.05	8.72	70%	0.07	0.05	-5.6%
Food Prep.	Oven	66%	0.00	0.00	0.39	66%	0.00	0.00	-12.5%
Food Prep.	Fryer	3%	0.01	0.00	0.03	3%	0.01	0.00	13.6%
Food Prep.	Broiler	32%	0.01	0.00	0.30	32%	0.00	0.00	-11.8%
Food Prep.	Griddle	36%	0.00	0.00	0.25	36%	0.00	0.00	-0.3%
Food Prep.	Range	40%	0.00	0.00	0.27	40%	0.00	0.00	-8.2%
Food Prep.	Steamer	0%	0.01	-	-	0%	0.01	-	-10.8%
Food Prep.	Other	0%	0.00	-	-	0%	0.00	-	-1.7%
Miscellaneous	Pool Heater	80%	0.01	0.01	1.13	80%	0.01	0.01	0.0%
Miscellaneous	Miscellaneous	24%	0.05	0.01	1.94	24%	0.05	0.01	0.0%
	Total			**0.21**	**35.46**			**0.21**	**-2.2%**

Table A-27 Industrial Electric Food Products Market Profile, 2011

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	3%	4,593.5	114.84	7.84	3%	4,194.8	110.11	-8.7%
Cooling	Water-Cooled Chiller	3%	4,434.2	110.86	7.56	3%	4,144.3	108.79	-6.5%
Cooling	Roof top AC	2%	7,001.6	116.79	7.97	2%	5,886.9	98.19	-15.9%
Cooling	Air Source Heat Pump	0%	7,079.5	4.28	0.29	0%	6,130.5	3.89	-13.4%
Cooling	Geothermal Heat Pump	4%	4,722.0	176.10	12.02	4%	4,340.0	169.95	-8.1%
Cooling	Other Cooling	0%	-	-	-	0%	-	-	0.0%
Heating	Air Source Heat Pump	0%	13,939.7	8.43	0.58	0%	12,790.7	8.12	-8.2%
Heating	Geothermal Heat Pump	4%	9,297.8	346.75	23.66	4%	8,339.7	326.57	-10.3%
Heating	Electric Resistance	0%	-	-	-	0%	-	-	0.0%
Heating	Electric Furnace	6%	21,407.1	1,274.42	86.96	6%	21,407.1	1,274.42	0.0%
Ventilation	Ventilation	100%	-	-	-	100%	-	-	0.0%
Interior Lighting	Screw-in	100%	430.8	430.77	29.39	100%	245.3	245.33	-43.0%
Interior Lighting	High-Bay Fixtures	100%	91.7	91.69	6.26	100%	63.9	63.94	-30.3%
Interior Lighting	Linear Fluorescent	100%	1,254.8	1,254.83	85.63	100%	989.5	989.51	-21.1%
Exterior Lighting	Screw-in	100%	0.8	0.81	0.05	100%	0.4	0.38	-52.7%
Exterior Lighting	HID	100%	339.4	339.37	23.16	100%	220.5	220.45	-35.0%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Exterior Lighting	Linear Fluorescent	100%	0.1	0.10	0.01	100%	0.1	0.08	-20.1%
Motors	Pumps	100%	3,845.8	3,845.75	262.42	105%	3,844.8	4,037.02	0.0%
Motors	Fans & Blowers	100%	2,766.0	2,765.99	188.74	105%	2,765.3	2,903.53	0.0%
Motors	Compressed Air	100%	1,558.8	1,558.84	106.37	105%	1,558.5	1,636.42	0.0%
Motors	Matl Handling	100%	2,356.7	2,356.74	160.82	105%	2,356.1	2,473.95	0.0%
Motors	Matl Processing	100%	3,346.8	3,346.80	228.37	105%	3,345.9	3,513.24	0.0%
Motors	Other Motors	100%	-	-	-	105%	-	-	0.0%
Process	Process Heating	100%	2,204.9	2,204.95	150.46	105%	2,204.9	2,315.19	0.0%
Process	Process Cooling and Refrig	100%	7,328.5	7,328.47	500.07	105%	7,328.5	7,694.90	0.0%
Process	Electro-Chemical Processes	100%	17.4	17.36	1.18	105%	17.4	18.22	0.0%
Process	Other Process	100%	164.3	164.33	11.21	105%	164.3	172.54	0.0%
Miscellaneous	Miscellaneous	100%	1,005.2	1,005.17	68.59	100%	1,005.2	1,005.17	0.0%
	Total			**28,864.42**	**1,969.60**			**29,389.94**	**1.8%**

Table A-28 Industrial Natural Gas Food Products Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	230.7	101.91	8.38	44%	199.7	88.22	-13.4%
Heating	Boiler	1%	2,949.2	39.69	3.27	1%	2,395.4	32.24	-18.8%
Heating	Other Heating	24%	207.6	50.16	4.13	24%	176.7	42.68	-14.9%
Process	Process Heating	100%	1,080.5	1,080.45	88.88	100%	918.4	918.38	-15.0%
Process	Process Boiler	100%	1,708.9	1,708.89	140.58	100%	1,393.3	1,393.31	-18.5%
Process	Process Cooling	100%	8.1	8.07	0.66	100%	6.9	6.86	-15.0%
Process	Other Process	100%	56.5	56.47	4.65	100%	48.0	48.00	-15.0%
Miscellaneous	Miscellaneous	100%	126.1	126.09	10.37	100%	126.1	126.09	0.0%
	Total			**3,171.74**	**260.92**			**2,656**	**-16.3%**

Table A-29 Industrial Electric Petroleum Market Profile, 2011

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	3%	20,644.7	516.12	6.81	3%	18,852.8	494.89	-8.7%
Cooling	Water-Cooled Chiller	3%	19,929.0	498.22	6.57	3%	18,626.1	488.93	-6.5%
Cooling	Roof top AC	2%	31,467.9	524.89	6.93	2%	26,457.9	441.32	-15.9%
Cooling	Air Source Heat Pump	0%	31,817.9	19.25	0.25	0%	27,552.8	17.50	-13.4%
Cooling	Geothermal Heat Pump	4%	21,222.5	791.47	10.44	4%	19,505.5	763.81	-8.1%
Cooling	Other Cooling	0%	-	-	-	0%	-	-	0.0%
Heating	Air Source Heat Pump	0%	62,650.1	37.90	0.50	0%	57,486.3	36.51	-8.2%
Heating	Geothermal Heat Pump	4%	41,787.6	1,558.43	20.56	4%	37,481.7	1,467.74	-10.3%

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Heating	Electric Resistance	0%	-	-	-	0%	-	-	0.0%
Heating	Electric Furnace	6%	96,211.3	5,727.70	75.58	6%	96,211.3	5,727.70	0.0%
Ventilation	Ventilation	100%	-	-	-	100%	-	-	0.0%
Interior Lighting	Screw-in	100%	1,521.2	1,521.18	20.07	100%	866.4	866.35	-43.0%
Interior Lighting	High-Bay Fixtures	100%	323.8	323.78	4.27	100%	225.8	225.80	-30.3%
Interior Lighting	Linear Fluorescent	100%	4,431.2	4,431.22	58.47	100%	3,494.3	3,494.27	-21.1%
Exterior Lighting	Screw-in	100%	2.8	2.84	0.04	100%	1.3	1.34	-52.7%
Exterior Lighting	HID	100%	1,198.4	1,198.41	15.81	100%	778.5	778.49	-35.0%
Exterior Lighting	Linear Fluorescent	100%	0.3	0.34	0.00	100%	0.3	0.27	-20.1%
Motors	Pumps	100%	84,590.2	84,590.15	1,116.15	105%	84,568.8	88,797.23	0.0%
Motors	Fans & Blowers	100%	33,633.7	33,633.68	443.79	105%	33,625.0	35,306.20	0.0%
Motors	Compressed Air	100%	38,789.2	38,789.21	511.82	105%	38,780.6	40,719.64	0.0%
Motors	Matl Handling	100%	-	-	-	105%	-	-	0.0%
Motors	Matl Processing	100%	91,206.6	91,206.61	1,203.45	105%	91,183.3	95,742.48	0.0%
Motors	Other Motors	100%	18,241.3	18,241.32	240.69	105%	18,236.7	19,148.50	0.0%
Process	Process Heating	100%	12,785.6	12,785.61	168.70	105%	12,785.6	13,424.89	0.0%
Process	Process Cooling and Refrig	100%	15,504.1	15,504.15	204.57	105%	15,504.1	16,279.35	0.0%
Process	Electro-Chemical Processes	100%	77.2	77.20	1.02	105%	77.2	81.06	0.0%
Process	Other Process	100%	1,425.9	1,425.93	18.81	105%	1,425.9	1,497.22	0.0%
Miscellaneous	Miscellaneous	100%	2,734.1	2,734.15	36.08	100%	2,734.1	2,734.15	0.0%
	Total			**316,139.77**	**4,171.41**			**328,535.66**	**3.9%**

Table A-30 Industrial Natural Gas Petroleum Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	234.2	103.47	0.44	44%	202.7	89.56	-13.4%
Heating	Boiler	1%	2,994.1	40.30	0.17	1%	2,431.9	32.73	-18.8%
Heating	Other Heating	24%	210.8	50.92	0.22	24%	179.4	43.33	-14.9%
Process	Process Heating	100%	8,846.0	8,846.00	37.97	100%	7,519.1	7,519.10	-15.0%
Process	Process Boiler	100%	4,432.4	4,432.45	19.03	100%	3,613.9	3,613.89	-18.5%
Process	Process Cooling	100%	11.5	11.47	0.05	100%	9.8	9.75	-15.0%
Process	Other Process	100%	491.7	491.69	2.11	100%	417.9	417.94	-15.0%
Miscellaneous	Miscellaneous	100%	229.2	229.22	0.98	100%	229.2	229.22	0.0%
	Total			**14,205.52**	**60.98**			**11,956**	**-15.8%**

Table A-31 Industrial Electric Metals Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	3%	2,730.2	68.25	4.64	3%	2,493.2	65.45	-8.7%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Water-Cooled Chiller	3%	2,635.5	65.89	4.48	3%	2,463.2	64.66	-6.5%
Cooling	Roof top AC	2%	4,161.5	69.41	4.72	2%	3,498.9	58.36	-15.9%
Cooling	Air Source Heat Pump	0%	4,207.8	2.55	0.17	0%	3,643.7	2.31	-13.4%
Cooling	Geothermal Heat Pump	4%	2,806.6	104.67	7.12	4%	2,579.5	101.01	-8.1%
Cooling	Other Cooling	0%	-	-	-	0%	-	-	0.0%
Heating	Air Source Heat Pump	0%	8,285.2	5.01	0.34	0%	7,602.3	4.83	-8.2%
Heating	Geothermal Heat Pump	4%	5,526.2	206.10	14.02	4%	4,956.8	194.10	-10.3%
Heating	Electric Resistance	0%	-	-	-	0%	-	-	0.0%
Heating	Electric Furnace	6%	12,723.5	757.46	51.52	6%	12,723.5	757.46	0.0%
Ventilation	Ventilation	100%	-	-	-	100%	-	-	0.0%
Interior Lighting	Screw-in	100%	299.2	299.16	20.35	100%	170.4	170.38	-43.0%
Interior Lighting	High-Bay Fixtures	100%	63.7	63.68	4.33	100%	44.4	44.41	-30.3%
Interior Lighting	Linear Fluorescent	100%	871.5	871.45	59.27	100%	687.2	687.19	-21.1%
Exterior Lighting	Screw-in	100%	0.6	0.56	0.04	100%	0.3	0.26	-52.7%
Exterior Lighting	HID	100%	235.7	235.68	16.03	100%	153.1	153.10	-35.0%
Exterior Lighting	Linear Fluorescent	100%	0.1	0.07	0.00	100%	0.1	0.05	-20.1%
Motors	Pumps	100%	1,252.2	1,252.22	85.16	105%	1,251.9	1,314.50	0.0%
Motors	Fans & Blowers	100%	2,087.0	2,087.04	141.94	105%	2,086.5	2,190.82	0.0%
Motors	Compressed Air	100%	2,087.0	2,087.04	141.94	105%	2,086.6	2,190.90	0.0%
Motors	Matl Handling	100%	2,504.4	2,504.45	170.33	105%	2,503.8	2,629.00	0.0%
Motors	Matl Processing	100%	2,754.9	2,754.89	187.36	105%	2,754.2	2,891.90	0.0%
Motors	Other Motors	100%	2,921.9	2,921.85	198.72	105%	2,921.1	3,067.16	0.0%
Process	Process Heating	100%	11,268.8	11,268.76	766.39	105%	11,268.8	11,832.20	0.0%
Process	Process Cooling and Refrig	100%	361.5	361.51	24.59	105%	361.5	379.59	0.0%
Process	Electro-Chemical Processes	100%	5,439.8	5,439.81	369.96	105%	5,439.8	5,711.80	0.0%
Process	Other Process	100%	295.2	295.19	20.08	105%	295.2	309.94	0.0%
Miscellaneous	Miscellaneous	100%	449.1	449.13	30.55	100%	449.1	449.13	0.0%
	Total			**34,171.81**	**2,324.03**			**35,270.52**	**3.2%**

Table A-32 Industrial Natural Gas Metals Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	468.2	206.87	8.05	44%	405.3	179.07	-13.4%
Heating	Boiler	1%	5,986.3	80.57	3.14	1%	4,862.2	65.44	-18.8%
Heating	Other Heating	24%	421.4	101.81	3.96	24%	358.6	86.63	-14.9%
Process	Process Heating	100%	3,811.4	3,811.37	148.35	100%	3,239.7	3,239.67	-15.0%
Process	Process Boiler	100%	443.4	443.44	17.26	100%	361.5	361.55	-18.5%
Process	Process Cooling	100%	13.4	13.40	0.52	100%	11.4	11.39	-15.0%
Process	Other Process	100%	105.7	105.67	4.11	100%	89.8	89.82	-15.0%
Miscellaneous	Miscellaneous	100%	118.3	118.34	4.61	100%	118.3	118.34	0.0%
	Total			**4,881.47**	**190.00**			**4,152**	**-14.9%**

Table A-33 Industrial Electric Machinery Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	**Technology**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Usage (GWh)**	**Saturation**	**UEC (kWh)**	**Intensity (kWh/HH)**	**Compared to Average**
Cooling	Air-Cooled Chiller	3%	10,591.2	264.78	9.72	3%	9,671.8	253.89	-8.7%
Cooling	Water-Cooled Chiller	3%	10,223.9	255.60	9.39	3%	9,555.5	250.83	-6.5%
Cooling	Roof top AC	2%	16,143.6	269.28	9.89	2%	13,573.4	226.41	-15.9%
Cooling	Air Source Heat Pump	0%	16,323.2	9.87	0.36	0%	14,135.1	8.98	-13.4%
Cooling	Geothermal Heat Pump	4%	10,887.6	406.04	14.91	4%	10,006.7	391.85	-8.1%
Cooling	Other Cooling	0%	-	-	-	0%	-	-	0.0%
Heating	Air Source Heat Pump	0%	32,140.8	19.44	0.71	0%	29,491.6	18.73	-8.2%
Heating	Geothermal Heat Pump	4%	21,437.9	799.51	29.36	4%	19,228.8	752.98	-10.3%
Heating	Electric Resistance	0%	-	-	-	0%	-	-	0.0%
Heating	Electric Furnace	6%	49,358.3	2,938.43	107.92	6%	49,358.3	2,938.43	0.0%
Ventilation	Ventilation	100%	-	-	-	100%	-	-	0.0%
Interior Lighting	Screw-in	100%	715.0	714.99	26.26	100%	407.2	407.21	-43.0%
Interior Lighting	High-Bay Fixtures	100%	152.2	152.18	5.59	100%	106.1	106.13	-30.3%
Interior Lighting	Linear Fluorescent	100%	2,082.8	2,082.78	76.50	100%	1,642.4	1,642.39	-21.1%
Exterior Lighting	Screw-in	100%	1.3	1.34	0.05	100%	0.6	0.63	-52.7%
Exterior Lighting	HID	100%	563.3	563.28	20.69	100%	365.9	365.91	-35.0%
Exterior Lighting	Linear Fluorescent	100%	0.2	0.16	0.01	100%	0.1	0.13	-20.1%
Motors	Pumps	100%	2,130.6	2,130.59	78.25	105%	2,130.1	2,236.56	0.0%
Motors	Fans & Blowers	100%	2,558.7	2,558.71	93.98	105%	2,558.1	2,685.95	0.0%
Motors	Compressed Air	100%	2,068.9	2,068.95	75.99	105%	2,068.5	2,171.91	0.0%
Motors	Matl Handling	100%	881.5	881.50	32.38	105%	881.3	925.34	0.0%
Motors	Matl Processing	100%	3,494.5	3,494.52	128.35	105%	3,493.6	3,668.31	0.0%
Motors	Other Motors	100%	73.4	73.43	2.70	105%	73.4	77.09	0.0%
Process	Process Heating	100%	1,656.0	1,656.01	60.82	105%	1,656.0	1,738.82	0.0%
Process	Process Cooling and Refrig	100%	651.2	651.24	23.92	105%	651.2	683.80	0.0%
Process	Electro-Chemical Processes	100%	54.6	54.58	2.00	105%	54.6	57.31	0.0%
Process	Other Process	100%	447.4	447.36	16.43	105%	447.4	469.73	0.0%
Miscellaneous	Miscellaneous	100%	1,194.1	1,194.12	43.86	100%	1,194.1	1,194.12	0.0%
	Total			**23,688.70**	**870.05**			**23,273.42**	**-1.8%**

Table A-34 Industrial Natural Gas Machinery Market Profile, 2011

		Natural Gas Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	1,181.5	521.97	11.94	44%	1,022.7	451.83	-13.4%
Heating	Boiler	1%	15,104.8	203.29	4.65	1%	12,268.5	165.12	-18.8%
Heating	Other Heating	24%	1,063.3	256.89	5.87	24%	904.8	218.59	-14.9%
Process	Process Heating	100%	652.4	652.36	14.92	100%	554.5	554.51	-15.0%
Process	Process Boiler	100%	503.9	503.90	11.52	100%	410.8	410.84	-18.5%
Process	Process Cooling	100%	17.9	17.91	0.41	100%	15.2	15.22	-15.0%
Process	Other Process	100%	111.0	110.96	2.54	100%	94.3	94.31	-15.0%
Miscellaneous	Miscellaneous	100%	87.1	87.06	1.99	100%	87.1	87.06	0.0%
	Total			**2,354.34**	**53.84**			**1,997**	**-15.2%**

Table A-35 Industrial Electric Other Industrial Market Profile, 2011

		Electric Average Market Profile				New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
Cooling	Air-Cooled Chiller	3%	8,974.5	224.36	39.21	3%	8,195.6	225.38	-8.7%
Cooling	Water-Cooled Chiller	3%	8,663.4	216.58	37.85	3%	8,097.0	222.67	-6.5%
Cooling	Roof top AC	2%	13,679.5	228.18	39.88	2%	11,501.6	191.85	-15.9%
Cooling	Air Source Heat Pump	0%	13,831.6	8.37	1.46	0%	11,977.6	7.97	-13.4%
Cooling	Geothermal Heat Pump	4%	9,225.7	344.06	60.13	4%	8,479.3	347.85	-8.1%
Cooling	Other Cooling	0%	-	-	-	0%	-	-	0.0%
Heating	Air Source Heat Pump	0%	27,234.9	16.48	2.88	0%	24,990.1	16.63	-8.2%
Heating	Geothermal Heat Pump	4%	18,165.6	677.47	118.41	4%	16,293.8	668.43	-10.3%
Heating	Electric Resistance	0%	-	-	-	0%	-	-	0.0%
Heating	Electric Furnace	6%	41,824.3	2,489.91	435.18	6%	41,824.3	2,489.91	0.0%
Ventilation	Ventilation	100%	-	-	-	100%	-	-	0.0%
Interior Lighting	Screw-in	100%	652.1	652.07	113.97	100%	371.4	371.37	-43.0%
Interior Lighting	High-Bay Fixtures	100%	138.8	138.79	24.26	100%	96.8	96.79	-30.3%
Interior Lighting	Linear Fluorescent	100%	1,899.5	1,899.49	331.99	100%	1,497.9	1,497.86	-21.1%
Exterior Lighting	Screw-in	100%	1.2	1.22	0.21	100%	0.6	0.58	-52.7%
Exterior Lighting	HID	100%	513.7	513.71	89.79	100%	333.7	333.71	-35.0%
Exterior Lighting	Linear Fluorescent	100%	0.1	0.15	0.03	100%	0.1	0.12	-20.1%
Motors	Pumps	100%	1,283.3	1,283.29	224.29	110%	1,283.0	1,411.26	0.0%
Motors	Fans & Blowers	100%	1,541.2	1,541.16	269.36	110%	1,540.8	1,694.83	0.0%
Motors	Compressed Air	100%	1,246.2	1,246.16	217.80	110%	1,245.9	1,370.47	0.0%
Motors	Matl Handling	100%	530.9	530.94	92.80	110%	530.8	583.89	0.0%
Motors	Matl Processing	100%	2,104.8	2,104.81	367.87	110%	2,104.3	2,314.70	0.0%
Motors	Other Motors	100%	44.2	44.23	7.73	110%	44.2	48.64	0.0%
Process	Process Heating	100%	2,072.8	2,072.82	362.28	110%	2,072.8	2,280.10	0.0%
Process	Process Cooling and Refrig	100%	1,085.9	1,085.85	189.78	110%	1,085.9	1,194.44	0.0%
Process	Electro-Chemical Processes	100%	51.7	51.72	9.04	110%	51.7	56.89	0.0%
Process	Other Process	100%	136.8	136.82	23.91	110%	136.8	150.51	0.0%
Miscellaneous	Miscellaneous	100%	1,056.8	1,056.76	184.70	100%	1,056.8	1,056.76	0.0%

Electric Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (kWh)	Intensity (kWh/HH)	Usage (GWh)	Saturation	UEC (kWh)	Intensity (kWh/HH)	Compared to Average
	Total			**18,565.40**	**3,244.83**			**18,633.59**	**0.4%**

Table A-36 Industrial Natural Gas Other Industrial Market Profile, 2011

Natural Gas Average Market Profile						New Units			
End Use	Technology	Saturation	UEC (therm)	Intensity (therm/HH)	Usage (MMTherms)	Saturation	UEC (therm)	Intensity (therm/HH)	Compared to Average
Heating	Furnace	44%	1,464.6	647.03	73.82	44%	1,267.8	560.09	-13.4%
Heating	Boiler	1%	18,723.9	252.00	28.75	1%	15,208.0	204.68	-18.8%
Heating	Other Heating	24%	1,318.1	318.44	36.33	24%	1,121.6	270.96	-14.9%
Process	Process Heating	100%	380.7	380.71	43.43	100%	323.6	323.60	-15.0%
Process	Process Boiler	100%	273.6	273.65	31.22	100%	223.1	223.11	-18.5%
Process	Process Cooling	100%	2.9	2.86	0.33	100%	2.4	2.43	-15.0%
Process	Other Process	100%	111.6	111.57	12.73	100%	94.8	94.83	-15.0%
Miscellaneous	Miscellaneous	100%	138.0	138.01	15.74	100%	138.0	138.01	0.0%
	Total			**2,124.28**	**242.34**			**1,818**	**-14.4%**

RESIDENTIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

This appendix presents detailed information for all energy-efficiency measures (*equipment* and *non-equipment* measures per the LoadMAP taxonomy) that were evaluated as part of this study. Several sets of tables are provided.

Measure Descriptions

Table B-1 and Table B-2 provide brief descriptions for all equipment and non-equipment measures that were assessed for potential.

Equipment Measure Data

Table B-3 through Table B-18 list the detailed unit-level data for the equipment measures for each of the housing type segments — Single Family, Multi Family, and for existing and new construction, respectively. Savings are in annual kWh per household, and incremental costs are in $/household ($/HH), unless noted otherwise. The BC ratio shown in the tables are for the first year of the potential analysis (2011), although the B/C ratio is calculated within LoadMAP for each year of the forecast. The B/C ratio in the tables is 1.00 if the measure represents the baseline technology, and zero if the technology is not available in 2013. The final data item in these tables is the levelized cost of conserved energy, which is defined as the cost of the measure divided by the cumulative amount of energy savings accrued over the measure's lifetime ($/kWh).

Non-Equipment Measure Data

Table B-19 through Table B-30 list the detailed unit-level data for the non-equipment energy efficiency measures for each of the housing type segments and for existing and new construction, respectively. Because these measures can produce energy-use savings for multiple end-use loads (e.g., insulation affects heating and cooling energy use) savings are expressed as a net percentage of all the relevant, combined end-use loads. Base saturation indicates the percentage of homes in which the measure is already installed. Applicability is a factor that accounts for whether the measure can be applied to the building. Cost is expressed in $/household. The detailed measure-level tables present the results of the benefit/cost (B/C) analysis for the first year of the analysis (2011) although the B/C ratio is calculated within LoadMAP for each year of the forecast. These tables also contain the levelized cost of conserved energy, which is defined as the cost of the measure divided by the cumulative amount of energy savings accrued over the measure's lifetime. This metric is given in terms of $/kWh.

Table B-1 Residential Energy Efficiency Equipment Measure Descriptions

Cooling	Central AC	Central air conditioners consist of a refrigeration system using a direct expansion cycle. Equipment includes a compressor, an air-cooled condenser (located outdoors), an expansion valve, and an evaporator coil. A supply fan near the evaporator coil distributes supply air through air ducts to the building. Cooling efficiencies vary based on materials used, equipment size, condenser type, and system configuration. CACs may be unitary (all components housed in a factory-built assembly) or split system (an outdoor condenser section and an indoor evaporator section connected by refrigerant lines and with the compressor either indoors or outdoors). Energy efficiency is rated according to the size of the unit using the Seasonal Energy Efficiency Rating (SEER). Ductless systems with Variable Refrigerant Flow further improve the operating efficiency.
Cooling	Room AC	Room air conditioners are designed to cool a single room or space. They incorporate a complete air-cooled refrigeration and air-handling system in an individual package. Room air conditioners come in several forms, including window, split-type, and packaged terminal units. Energy efficiency is rated according to the size of the unit using the Energy Efficiency Rating (EER).
Cooling / Heating	Air-Source Heat Pump	A central heat pump consists of components similar to a CAC system, but is usually designed to function both as a heat pump and an air conditioner. It consists of a refrigeration system using a direct expansion (DX) cycle. Equipment includes a compressor, an air-cooled condenser (located outdoors), an expansion valve, and an evaporator coil (located in the supply air duct near the supply fan) and a reversing valve to change the DX cycle from cooling to heating when required. The cooling and heating efficiencies vary based on the materials used, equipment size, condenser type, and system configuration. Heat pumps may be unitary (all components housed in a factory-built assembly) or a split system (an outdoor condenser section and an indoor evaporator section connected by refrigerant lines, with either outdoors or indoors. A high-efficiency option for a ductless mini-split system is also analyzed.
Cooling / Heating	Geothermal Heat Pump	Geothermal heat pumps are similar to air-source heat pumps, but use the ground or groundwater instead of outside air to provide a heat source/sink. A geothermal heat pump system generally consists of three major subsystems or parts: a geothermal heat pump to move heat between the building and the fluid in the earth connection, an earth connection for transferring heat between the fluid and the earth, and a distribution subsystem for delivering heating or cooling to the building. The system may also have a desuperheater to supplement the building's water heater, or a full-demand water heater to meet all of the building's hot water needs.
Cooling / Heating	PTHP	This measure includes efficiency upgrades to other small cooling systems including room AC units, packaged terminal air conditioning (PTAC) units, and packaged terminal heat pumps (PTHP).
Heating	Electric Resistance	Resistive heating elements are used to convert electricity directly to heat. Conductive fins surrounding the element or another mechanism is used to deliver the heat directly to the surrounding room or area. These are typically either baseboard or wall-mounted units.
Heating	Furnace/Boiler	Furnaces heat air and distribute the heated air through the building using ducts. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to

		reduce cycling losses, smaller-diameter flue pipe, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Water Heating	Water Heater	For electric hot water heating, the most common type is a storage heater, which incorporates an electric heating element, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available through a heat pump water heater (HPWH), which uses a vapor-compression thermodynamic cycle similar to that found in an air-conditioner or refrigerator to extract heat from an available source (e.g., air) and reject that heat to a higher temperature sink, in this case, the water in the water heater. Electric instantaneous water heaters are available, but are excluded from this study due to potentially high instantaneous demand concerns. For natural gas hot water heating, the most common type is a storage heater, which incorporates a burner, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available in condensing units, which condense the water vapor produced in the combustion process and also use the heat from this condensation.
Interior Lighting	Screw-in	Infrared halogen lamps are designed to be a replacement for standards incandescent lamps. Also referred to as advanced incandescent lamps, these products meet the Energy Independence and Security Act (EISA) lighting standards and are phased in as the baseline technology screw-in lamp technology to reflect the timeline over which the EISA lighting standards take effect. Compact fluorescent lamps are designed to be a replacement for standard incandescent lamps and use about 25% of the energy used by standard incandescent lamps to produce the same lumen output. They can use either electronic or magnetic ballasts. Integral compact fluorescent lamps have the ballast integrated into the base of the lamp and have a standard screw-in base that permits installation into existing incandescent fixtures. Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are significantly higher. LED models under development are expected to provide improved efficacies.
Interior Lighting	Linear Fluorescent	T8 fluorescent lamps are smaller in diameter than standard T12 lamps, resulting in greater light output per watt. T8 lamps also operate at a lower current and wattage, which increases the efficiency of the ballast but requires the lamps to be compatible with the ballast. Fluorescent lamp fixtures can include a reflector that increases the light output from the fixture, and thus make it possible to use a fewer number of lamps in each fixture. T5 lamps further increase efficiency by reducing the lamp diameter to 5/8”. Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are

		significantly higher. LED models under development are expected to provide improved efficacies.
Interior Lighting	Specialty Lighting	Bulbs that the DOE does not consider conventional and are not covered by federal efficiency standards. These include: appliance bulbs, heavy-duty bulbs, dimmable bulbs, three-way bulbs, G shape (globe) lamps, candelabra base, and others.
Exterior Lighting	Screw-in	Infrared halogen lamps are designed to be a replacement for standards incandescent lamps. Also referred to as advanced incandescent lamps, these products meet the Energy Independence and Security Act (EISA) lighting standards and are phased in as the baseline technology screw-in lamp technology to reflect the timeline over which the EISA lighting standards take effect. Compact fluorescent lamps are designed to be a replacement for standard incandescent lamps and use about 25% of the energy used by standard incandescent lamps to produce the same lumen output. They can use either electronic or magnetic ballasts. Integral compact fluorescent lamps have the ballast integrated into the base of the lamp and have a standard screw-in base that permits installation into existing incandescent fixtures. Light-emitting diode (LED) lighting has seen recent penetration in specific applications such as traffic lights and exit signs. With the potential for extremely high efficiency, LEDs show promise to provide general-use lighting for interior spaces. Current models commercially available have efficacies comparable to CFLs. However, theoretical efficiencies are significantly higher. LED models under development are expected to provide improved efficacies.
Appliances	Refrigerator	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Second Refrigerator	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Freezer	Energy-efficient refrigerators/freezers incorporate features such as improved cabinet insulation, more efficient compressors and evaporator fans, defrost controls, mullion heaters, oversized condenser coils, and improved door seals. Further efficiency increases can be obtained by reducing the volume of refrigerated space, or adding multiple compartments to reduce losses from opening doors.
Appliances	Clothes Washer	High efficiency clothes washers use superior designs that require less water. Sensors match the hot water needs to the size and soil level of the load, preventing energy waste. Further energy and water savings can be achieved through advanced technologies such as inverter-drive or combination washer-dryer units. MEF is the official energy efficiency metric used to compare relative efficiencies of different clothes washers. MEF considers the energy used to run the washer, heat the water, and run the dryer. The higher the MEF, the more efficient the clothes washer.

Appliances	Clothes Dryer	An energy-efficient clothes dryer has a moisture-sensing device to terminate the drying cycle rather than using a timer and an energy-efficient motor is used for spinning the dryer tub. Application of a heat pump cycle for extracting the moisture from clothes leads to additional energy savings.
Appliances	Dishwasher	High efficiency dishwashers save by using both improved technology for the primary wash cycle, and by using less hot water. Construction includes more effective washing action, energy-efficient motors, and other advanced technology such as sensors that determine the length of the wash cycle and the temperature of the water necessary to clean the dishes.
Appliances	Stove	These products have additional insulation in the oven compartment and tighter-fitting oven door gaskets and hinges to save energy. Conventional ovens must first heat up about 35 pounds of steel and a large amount of air before they heat up the food. Higher efficiency options include convection ovens, halogen burners, and induction burners.
Appliances	Microwave	Appliance that heats food with microwave radiation. No high efficiency option is modeled.
Electronics	Personal Computers	Improved power management can significantly reduce the annual energy consumption of PCs and monitors in both standby and normal operation. ENERGY STAR and Climate Savers labeled products provide increasing level of energy efficiency.
Electronics	Monitor	High efficiency electronics use efficient components and employ sleep/power save modes.
Electronics	Laptops	High efficiency electronics use efficient components and employ sleep/power save modes.
Electronics	Printer/Fax/Copier	High efficiency electronics use efficient components and employ sleep/power save modes.
Electronics	TVs	In the average home, electronic products consumed significant energy, even when they are turn off, to maintain features like clocks, remote control, and channel/station memory. ENERGY STAR labeled consumer electronics can drastically reduce consumption during standby mode, in addition to saving energy through advanced power management during normal use.
Electronics	Devices and Gadgets	High efficiency electronics can use efficient components and employ sleep/power save modes.
Electronics	Set-top Boxes/DVR	High efficiency electronics can use efficient components and employ sleep/power save modes.
Miscellaneous	Pool Heater	Efficient pool heaters can make use of heat pump technology to achieve significantly higher coefficients of performance in the COP=5.0 range. Gas pool heaters have a burner to heat water in a loop. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Miscellaneous	Pool Pump	High-efficiency motors and two-speed pumps provide improved energy

		efficiency for this load.
Miscellaneous	Furnace Fan	In homes heated by a furnace, there is still substantial energy use by the fan responsible for moving the hot air throughout the ductwork. Application of an Electronically Commutating Motor (ECM) ensures that motor speed matches the heating requirements of the system and saves energy when compared to a continuously operating standard motor.
Miscellaneous	Well Pump	Existing well pumps can achieve efficiency improvements by using optimized system components and more efficient motors. Efficiencies: Baseline 40% EF, High Efficiency 60% EF
Miscellaneous	Hot Tub/Spa	High-efficiency motors and two-speed pumps provide improved energy efficiency for this load.
Miscellaneous	Air Purifier/Cleaner	An air purifier (cleaner) meeting the efficiency specifications of ENERGY STAR is purchased and installed in place of a model meeting the current federal standard.
Miscellaneous	Dehumidifier	A dehumidifier meeting the minimum qualifying efficiency standard established by the current ENERGY STAR(Version 2.1 or 3.0) is purchased and installed in a residential setting in place of a unit that meets the minimum federal standard efficiency.
Miscellaneous	Bathroom Exhaust Fan	This market opportunity is defined by the need for continuous mechanical ventilation due to reduced air-infiltration from a tighter building shell. In retrofit projects, existing fans may be too loud, or insufficient in other ways, to be operated as required for proper ventilation. This measure assumes a fan capacity of 50 CFM rated at a sound level of less than 2.0 sones at 0.1 inches of water column static pressure. This measure may be applied to larger capacity, up to 130 CFM, efficient fans with bi-level controls because the savings and incremental costs are very similar. All eligible installations shall be sized to provide the mechanical ventilation rate indicated by ASHRAE 62.2.
Miscellaneous	Miscellaneous	Improvement of miscellaneous electricity uses.

Table B-2 Residential Energy Efficiency Non-Equipment Measure Descriptions

HVAC (All)	Insulation - Ceiling	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation above ceilings can conserve energy by reducing the heat loss or gain into attics and/or through roofs. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene.
Cooling	Insulation - Ducting	Air distribution ducts can be insulated to reduce heating or cooling losses. Best results can be achieved by covering the entire surface area with insulation. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated duct, duct board, duct wrap, tacked, or glued rigid insulation, and waterproof hard shell materials for exterior ducts. This analysis assumes that installing duct insulation can reduce the temperature drop/gain in ducts by 50%.
HVAC (All)	Insulation - Foundation	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Foundation insulation is modeled for new construction / major retrofits only.
HVAC (All)	Insulation - Infiltration Control	Lowering the air infiltration rate by caulking small leaks and weather-stripping around window frames, doorframes, power outlets, plumbing, and wall corners can provide significant energy savings. Weather-stripping doors and windows will create a tight seal and further reduce air infiltration.
HVAC (All)	Insulation - Radiant Barrier	Radiant barriers are materials installed to reduce the heat gain in buildings. Radiant barriers are made from materials that are highly reflective and have low emissivity like aluminum. The closer the emissivity is to 0 the better they will perform. Radiant barriers can be placed above the insulation or on the roof rafters.
HVAC (All)	Insulation - Wall Cavity	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Wall insulation is modeled for new construction / major retrofits only.
HVAC (All)	Insulation - Wall Sheathing	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing heat loss or gain from a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose, loose-fill (blown) fiberglass, and rigid polystyrene. Wall sheathing is modeled for new construction / major retrofits only.
Cooling	Ducting - Repair and Sealing	Leakage in unsealed ducts varies considerably because of the differences in fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. Air leaks from the system to the outdoors result in a direct loss proportional to the amount of leakage and the difference in enthalpy between the outdoor air and the conditioned air. To seal ducts, a wide variety of sealing methods and products exist. Each has a relatively short shelf life, and no documented research has identified the aging characteristics of sealant applications.
HVAC (All)	Windows - High Efficiency/ENERGY STAR	High-efficiency windows, such as those labeled under the ENERGY STAR Program, are designed to reduce energy use and increase occupant comfort. High-efficiency windows reduce the amount of heat transfer through the glazing surface. For example, some windows have a low-E coating, a thin film of

		metallic oxide coating on the glass surface that allows passage of short-wave solar energy through glass and prevents long-wave energy from escaping. Another example is double-pane glass that reduces conductive and convective heat transfer. Some double-pane windows are gas-filled (usually argon) to further increase the insulating properties of the window.
HVAC (All)	Windows - Install Reflective Film	Reflective films applied to the window interior help reduce solar gain into the space and thus lower cooling energy use.
HVAC (All)	Doors - Storm and Thermal	Like other components of the shell, doors are subject to several types of heat loss: conduction, infiltration, and radiant losses. Similar to a storm window, a storm door creates an insulating air space between the storm and primary doors. A tight fitting storm door can also help reduce air leakage or infiltration. Thermal doors have exceptional thermal insulation properties and also are provided with weather-stripping on the doorframe to reduce air leakage.
HVAC (All)	Roofs - High Reflectivity	The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface and subsequently transferred into a building. This is called solar absorptance. By using a living roof or a roofing material with a light color (and a lower solar absorptance), the roof will absorb less solar radiation and consequently reduce the cooling load. Living roofs also reduce stormwater runoff.
HVAC (All)	Attic Fan - Installation	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the house. A well-ventilated attic can be several degrees cooler than a comparable, unventilated attic. An option for an attic fan equipped with a small solar photovoltaic generator is also modeled.
HVAC (All)	Attic Fan - Photovoltaic - Installation	Attic fans can reduce the need for AC by reducing heat transfer from the attic through the ceiling of the house. A well-ventilated attic can be several degrees cooler than a comparable, unventilated attic. An option for an attic fan equipped with a small solar photovoltaic generator is also modeled.
HVAC (All)	Whole-House Fan - Installation	Whole-house fans can reduce the need for AC on moderate-weather days or on cool evenings. The fan facilitates a quick air change throughout the entire house. Several windows must be open to achieve the best results. The fan is mounted on the top floor of the house, usually in a hallway ceiling.
HVAC (All)	Ceiling Fan - Installation	Ceiling fans can reduce the need for air conditioning. However, the house occupants must also select a ceiling fan with a high-efficiency motor and either shutoff the AC system or setup the thermostat temperature of the air conditioning system to realize the potential energy savings. Some ceiling fans also come with lamps. In this analysis, it is assumed that there are no lamps, and installing a ceiling fan will allow occupants to increase the thermostat cooling setpoint up by 2°F.
HVAC (All)	Thermostat - Clock/Programmable	A programmable thermostat can be added to most heating/cooling systems. They are typically used during winter to lower temperatures at night and in summer to increase temperatures during the afternoon. The energy savings from this type of thermostat are identical to those of a "setback" strategy with standard thermostats, but the convenience of a programmable thermostat makes it a much more attractive option. In this analysis, the baseline is assumed to have no thermostat setback.
HVAC (All)	Home Energy Management System	A centralized home energy management system can be used to control and schedule cooling, space heating, lighting, and possibly appliances as well. Some designs also allow the homeowner to remotely control loads via the Internet.
Cooling	Central AC - Early Replacement	CAC systems currently on the market are significantly more efficient that older units, due to technology improvement and stricter appliance standards. This measure incents homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Cooling	Central AC - Maintenance and Tune-Up	An air conditioner's filters, coils, and fins require regular cleaning and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the AC unit to use more energy for the same cooling

		load.
Cooling / Heating	Central Heat Pump - Maintenance	A heat pump's filters, coils, and fins require regular cleaning and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance ensures a steady decline in performance while energy use steadily increases.
Cooling	Room AC - Removal of Second Unit	Homeowners may have a second room AC unit that is extremely inefficient. This measure incents homeowners to recycle the second unit and thus also eliminates associated electricity use.
Heating	Boiler- Hot Water Reset	Automatic control algorithm for boilers that varies the water temperature of the supply loop in an inverse relationship with the measured outside air temperature. If it is warmer outside, the hot water supply loop does not have to be as hot, thereby tailoring boiler heat output to the demand and saving energy.
Heating	Boiler- Pipe Insulation	Insulating hot water pipes decreases energy losses from piping that distributes hot water throughout the building. It also results in quicker delivery of hot water and may allow the lowering of the hot water set point, which saves energy. The most common insulation materials for this purpose are polyethylene and neoprene.
Heating	Boiler- Maintenance	A boiler's combustion controls, circulation loops, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Heating	Furnace- Maintenance	A furnace's combustion controls, ventilation systems, and heat exchanger require regular checks and maintenance for the unit to function effectively and efficiently throughout its life. Neglecting necessary maintenance leads to a steady decline in performance, requiring the unit to use more energy for the same heating load.
Water Heating	Water Heater - Drainwater Heat Recovery	Drainwater Heat Recovery is a system in which drain water is used to preheat cold water entering the water heater. While these systems themselves are relatively inexpensive, upgrading an existing system could be unreasonable because of demolition costs. Thus they are modeled for new vintage only.
Water Heating	Water Heater - Faucet Aerators	Water faucet aerators are threaded screens that attach to existing faucets. They reduce the volume of water coming out of faucets while introducing air into the water stream. This measure provides energy saving by reducing hot water use, as well as water conservation for both hot and cold water.
Water Heating	Water Heater - Low-Flow Showerheads	Similar to faucet aerators, low-flow showerheads reduce the consumption of hot water, which in turn decreases water heating energy use.
Water Heating	Water Heater - Pipe Insulation	Insulating hot water pipes decreases energy losses from piping that distributes hot water throughout the building. It also results in quicker delivery of hot water and may allow the lowering of the hot water set point, which saves energy. The most common insulation materials for this purpose are polyethylene and neoprene.
Water Heating	Water Heater - Timer	These measures use either a programmable thermostat or a timer to adjust the water heater setpoint at times of low usage, typically when a home is unoccupied.
Water Heating	Water Heater - Desuperheater	A desuperheater can be added to an existing geothermal heat pump system (typically installed with the primary function of space heating and cooling) in order to draw off a portion of the geothermal heat for water heating purposes. The system can either supplement the building's water heater, or be a full-demand water heater that meets all of the building's hot water needs.
Water Heating	Water Heater - Solar System	Solar water heating systems can be used in residential buildings that have an appropriate near-south-facing roof or nearby unshaded grounds for installing a collector. Although system types vary, in general these systems use a solar absorber surface within a solar collector or an actual storage tank. Either a

		heat-transfer fluid or the actual potable water flows through tubes attached to the absorber and transfers heat from it. (Systems with a separate heat-transfer-fluid loop include a heat exchanger that then heats the potable water.) The heated water is stored in a separate preheat tank or a conventional water heater tank. If additional heat is needed, it is provided by a conventional water-heating system.
Interior Lighting	Interior Lighting - Occupancy Sensors	Occupancy sensors turn lights off when a space is unoccupied. They are appropriate for areas with intermittent use, such as bathrooms or storage areas.
Exterior Lighting	Exterior Lighting - Photosensor Control	Photosensor controls turn exterior lighting on or off based on ambient lighting levels. Compared with manual operation, this can reduce the operation of exterior lighting during daylight hours.
Exterior Lighting	Exterior Lighting - Photovoltaic Installation	Solar photovoltaic generation may be used to power exterior lighting and thus eliminate all or part of the electrical energy use.
Exterior Lighting	Exterior Lighting - Timeclock Installation	Lighting timers turn exterior lighting on or off based on a preset schedule. Compared with manual operation, this can reduce the operation of exterior lighting during daylight hours.
Appliances	Refrigerator - Early Replacement	Refrigerators/freezers currently on the market are significantly more efficient that older units, due to technology improvement and stricter appliance standards. This measure incents homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Appliances	Refrigerator - Maintenance	This measure includes repairing and recharging refrigerant lines, cleaning condenser coils, and replacing the oil. This reduces energy consumption by improving the rate at which the system can compress and cool refrigerant as it moves through the system.
Appliances	Refrigerator - Remove Second Unit	Homeowners may have a second refrigerator or freezer that is not used to full capacity and that, because of its age, is extremely inefficient. This measure incents homeowners to recycle the second unit and thus also eliminates associated electricity use.
Appliances	Freezer - Remove Second Unit	Homeowners may have a second refrigerator or freezer that is not used to full capacity and that, because of its age, is extremely inefficient. This measure incents homeowners to recycle the second unit and thus also eliminates associated electricity use.
Appliances	Freezer - Early Replacement	Refrigerators/freezers currently on the market are significantly more efficient that older units, due to technology improvement and stricter appliance standards. This measure incents homeowners to replace an aging but still working unit with a new, higher-efficiency one.
Appliances	Freezer - Maintenance	This measure includes repairing and recharging refrigerant lines, cleaning condenser coils, and replacing the oil. This reduces energy consumption by improving the rate at which the system can compress and cool refrigerant as it moves through the system.
Electronics	Electronics - Smart Power Strips	Representing a growing portion of home electricity consumption, plug-in electronics such as set-top boxes, DVD players, gaming systems, digital video recorders, and even battery chargers for mobile phones and laptop computers are often designed to supply a set voltage. When the units are not in use, this voltage could be dropped significantly (~1 W) and thereby generate a significant energy savings, assumed for this analysis to be between 4-5% on average. These savings are in excess of the measures already discussed for computers and televisions.
Miscellaneous	Pool Pump - Timer	A pool pump timer allows the pump to turn off automatically, eliminating the wasted energy associated with unnecessary pumping.
Miscellaneous	Pool Heater - Solar System	This measure replaces a conventional pool heater with a solar system.
HVAC (All)	ENERGY STAR Home	ENERGY STAR home design uses an integrated approach to the design of new

	Design	buildings to account for the interaction of building systems. Designs may specify the building orientation, building shell, proper sizing of equipment and systems, and controls strategies with the goal of optimizing building energy efficiency and comfort. Options that may be evaluated and incorporated include passive solar strategies, increased thermal mass, natural ventilation, energy recovery ventilation, daylighting strategies, and shading strategies; but with specific requirements that adhere to the ENERGY STAR standard and measurement system. This measure is modeled for new vintage only.
Miscellaneous	Information Based Energy Efficiency Programs	This measure will include the impacts from behavioral information-based programs such as Opower, where the evaluations have isolated valid behavioral effects from the technology effects of all the other measures listed here.
Miscellaneous	Combined Boiler and Water Heating Unit	This measure applies to natural gas boilers that supply hot water for space heat and domestic hot water through on-demand supply. In order for this characterization to apply, the efficient equipment must be a condensing boiler for space heating with on-demand domestic hot water and a AFUE great than or equal to 90%. It is assumed to be installed in a non-residential space and replace existing natural gas equipment used for the same purpose.
Miscellaneous	Pool/Spa Cover	A pool or spa cover (also referred to as a solar cover or solar blanket) keeps the water in the pool warmer by absorbing heat from the sun and transferring the heat to the pool water, reducing the energy used by the pool heater.

Table B-3 Energy Efficiency Equipment Data, Electric Customer Only—Single Family, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	189.48	$404.13	18	1.01	$0.20
Cooling	Central AC	SEER 15 (CEE Tier 2)	273.33	$808.27	18	0.73	$0.27
Cooling	Central AC	SEER 16 (CEE Tier 3)	344.31	$1,212.40	18	0.61	$0.33
Cooling	Central AC	Ductless Minisplit	404.68	$2,631.48	18	0.33	$0.60
Cooling	Central AC	SEER 21	763.15	$3,083.65	18	0.53	$0.38
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	93.57	$39.29	12	-	$0.05
Cooling	Room AC	EER 11.0	110.37	$78.58	12	1.00	$0.08
Cooling	Room AC	EER 11.5	149.52	$390.44	12	0.20	$0.31
Cooling	Room AC	EER 12.0	185.43	$702.29	12	0.19	$0.45
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	129.00	$132.23	18	2.22	$0.10
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	188.48	$264.46	18	1.62	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	238.64	$396.70	18	1.37	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	281.28	$3,040.37	18	0.21	$1.00
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	96.98	$647.88	18	0.34	$0.62
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	171.73	$2,105.60	18	0.19	$1.14
Cooling	Geothermal Heat Pump	EER 30, COP 5	708.86	$6,478.78	18	0.25	$0.85
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	41.22	$17.14	15	4.33	$0.04
Cooling	PTHP	EER 10.8	97.32	$42.86	15	4.09	$0.05
Cooling	PTHP	EER 11	114.67	$51.43	15	4.01	$0.05
Cooling	PTHP	EER 11.5	155.38	$72.86	15	3.84	$0.05
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	484.08	$71.45	18	4.32	$0.01
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	882.72	$142.91	18	3.94	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,210.54	$214.36	18	3.60	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	1,473.69	$1,642.89	18	0.56	$0.10
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	251.50	$691.66	18	0.23	$0.26
Heating	Geothermal Heat Pump	EER 18, COP 3.8	436.69	$2,247.90	18	0.12	$0.48
Heating	Geothermal Heat Pump	EER 30, COP 5	2,540.84	$6,916.60	18	0.23	$0.25
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	39.50	$17.14	15	1.17	$0.04
Heating	PTHP	EER 10.8	93.28	$42.86	15	1.10	$0.05
Heating	PTHP	EER 11	109.89	$51.43	15	1.08	$0.05
Heating	PTHP	EER 11.5	148.92	$72.86	15	1.04	$0.05
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	137.26	$100.00	13	0.68	$0.08
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,435.36	$1,575.00	13	0.49	$0.12
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,588.55	$1,703.00	13	0.50	$0.12
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	146.31	$40.00	13	1.81	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,530.02	$574.44	13	1.47	$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,693.30	$731.11	13	1.26	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	293.12	$119.61	4	1.00	$0.11
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,069.58	$119.61	4	-	$0.03
Interior Lighting	Screw-in	CFL	1,212.55	$48.18	6	1.00	$0.01
Interior Lighting	Screw-in	LED	1,272.23	$3,947.28	15	0.12	$0.32
Interior Lighting	Screw-in	LED (2020)	1,403.50	$225.96	15	-	$0.02
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	13.08	($4.64)	10	1.00	($0.05)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	28.71	$2,916.92	20	-	$8.97
Interior Lighting	Linear Fluorescent	Super T8	39.18	$37.06	10	0.24	$0.13
Interior Lighting	Linear Fluorescent	T5	39.74	$63.56	10	0.15	$0.21
Interior Lighting	Linear Fluorescent	LED (2020)	78.01	$128.03	20	-	$0.14
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	65.97	$148.56	4	0.04	$0.62
Interior Lighting	Specialty	CFL	272.89	$59.85	6	0.89	$0.04
Interior Lighting	Specialty	LED	286.32	$1,629.20	15	0.07	$0.58
Interior Lighting	Specialty	LED (2020)	315.87	$88.53	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	26.86	$23.34	4	1.00	$0.24
Exterior Lighting	Screw-in	Infrared Halogen (2020)	166.17	$23.34	4	-	$0.04
Exterior Lighting	Screw-in	CFL	191.82	$12.04	5	1.00	$0.01
Exterior Lighting	Screw-in	LED	208.31	$773.14	10	0.10	$0.49
Exterior Lighting	Screw-in	LED (2020)	226.09	$44.17	15	-	$0.02
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.48	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.83	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.63	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	177.01	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.55	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.39	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.28	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.18	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.71	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.26	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.85	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.53	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.96	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.95	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.70	$458.00	14	0.05	$1.23
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	25.46	$100.00	13	0.13	$0.44
Appliances	Clothes Dryer	Baseline (2015+)	26.73	$75.00	13	-	$0.31
Appliances	Clothes Dryer	High Efficiency (2015+)	59.86	$175.00	13	-	$0.33
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.61	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.29	$121.00	13	0.01	$10.50
Appliances	Stove	Halogen Burner	4.25	$580.00	13	0.00	$15.26
Appliances	Stove	Induction	23.88	$898.00	13	0.02	$4.21
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,674.83	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	227.97	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	600.47	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,556.93	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	213.26	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	462.23	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.53	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.59	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.03	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.60	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	87.65	$97.00	20	0.70	$0.10
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.44	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-4 Energy Efficiency Equipment Data, Electric Customer Only—Single Family, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	229.17	$507.67	18	0.97	$0.21
Cooling	Central AC	SEER 15 (CEE Tier 2)	333.69	$1,015.33	18	0.71	$0.28
Cooling	Central AC	SEER 16 (CEE Tier 3)	421.45	$1,523.00	18	0.59	$0.34
Cooling	Central AC	Ductless Minisplit	496.35	$3,305.62	18	0.32	$0.62
Cooling	Central AC	SEER 21	561.12	$3,873.62	18	0.31	$0.64
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	104.85	$39.29	12	-	$0.04
Cooling	Room AC	EER 11.0	123.47	$78.58	12	1.00	$0.07
Cooling	Room AC	EER 11.5	167.41	$390.44	12	0.22	$0.27
Cooling	Room AC	EER 12.0	207.62	$702.29	12	0.21	$0.40
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	146.91	$149.87	18	2.23	$0.09
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	213.92	$299.74	18	1.63	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	270.17	$449.61	18	1.37	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	318.19	$3,445.89	18	0.21	$1.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	155.86	$734.29	18	0.48	$0.44
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	276.12	$2,386.45	18	0.26	$0.80
Cooling	Geothermal Heat Pump	EER 30, COP 5	1,150.84	$7,342.91	18	0.36	$0.59
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	41.22	$17.14	15	4.33	$0.04
Cooling	PTHP	EER 10.8	97.32	$42.86	15	4.09	$0.05
Cooling	PTHP	EER 11	114.67	$51.43	15	4.01	$0.05
Cooling	PTHP	EER 11.5	155.38	$72.86	15	3.84	$0.05
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	491.23	$80.98	18	3.87	$0.02
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	887.48	$161.97	18	3.49	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,212.42	$242.95	18	3.18	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	1,465.01	$1,862.02	18	0.49	$0.12
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	210.38	$783.92	18	0.17	$0.35
Heating	Geothermal Heat Pump	EER 18, COP 3.8	360.02	$2,547.74	18	0.09	$0.66
Heating	Geothermal Heat Pump	EER 30, COP 5	2,743.39	$7,839.21	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	39.50	$17.14	15	1.17	$0.04
Heating	PTHP	EER 10.8	93.28	$42.86	15	1.10	$0.05
Heating	PTHP	EER 11	109.89	$51.43	15	1.08	$0.05
Heating	PTHP	EER 11.5	148.92	$72.86	15	1.04	$0.05
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	124.19	$100.00	13	0.61	$0.09
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,298.66	$1,575.00	13	0.44	$0.14
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,437.26	$1,703.00	13	0.45	$0.13
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	132.38	$40.00	13	1.64	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,384.30	$574.44	13	1.33	$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,532.03	$731.11	13	1.14	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	265.71	$108.42	4	1.00	$0.11
Interior Lighting	Screw-in	Infrared Halogen (2020)	969.55	$108.42	4	-	$0.03
Interior Lighting	Screw-in	CFL	1,099.14	$43.68	6	1.00	$0.01
Interior Lighting	Screw-in	LED	1,153.24	$3,578.10	15	0.12	$0.32
Interior Lighting	Screw-in	LED (2020)	1,272.24	$204.83	15	-	$0.02
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	1.23	($0.44)	10	1.00	($0.05)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	2.71	$274.92	20	-	$8.97
Interior Lighting	Linear Fluorescent	Super T8	3.69	$3.49	10	0.24	$0.13
Interior Lighting	Linear Fluorescent	T5	3.75	$5.99	10	0.15	$0.21
Interior Lighting	Linear Fluorescent	LED (2020)	7.35	$12.07	20	-	$0.14
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	65.58	$147.68	4	0.04	$0.62
Interior Lighting	Specialty	CFL	271.28	$59.49	6	0.89	$0.04
Interior Lighting	Specialty	LED	284.63	$1,619.59	15	0.07	$0.58
Interior Lighting	Specialty	LED (2020)	314.00	$88.01	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	25.13	$21.84	4	1.00	$0.24
Exterior Lighting	Screw-in	Infrared Halogen (2020)	155.48	$21.84	4	-	$0.04
Exterior Lighting	Screw-in	CFL	179.47	$11.27	5	1.00	$0.01
Exterior Lighting	Screw-in	LED	194.90	$723.37	10	0.10	$0.49
Exterior Lighting	Screw-in	LED (2020)	211.53	$41.33	15	-	$0.02
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.48	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.83	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.63	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	177.01	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.55	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.39	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.28	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.18	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.71	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.26	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.85	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.53	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.96	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.95	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.70	$458.00	14	0.05	$1.23
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	25.46	$100.00	13	0.13	$0.44
Appliances	Clothes Dryer	Baseline (2015+)	26.73	$75.00	13	-	$0.31
Appliances	Clothes Dryer	High Efficiency (2015+)	59.86	$175.00	13	-	$0.33
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.61	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.29	$121.00	13	0.01	$10.50
Appliances	Stove	Halogen Burner	4.25	$580.00	13	0.00	$15.26
Appliances	Stove	Induction	23.88	$898.00	13	0.02	$4.21
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,674.83	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	227.97	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	600.47	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,556.93	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	213.26	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	462.23	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.53	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.59	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.03	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.60	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	87.65	$97.00	20	0.70	$0.10
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.44	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-5 Energy Efficiency Equipment Data, Electric Customer Only—Multi Family, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	55.66	$369.67	18	0.31	$0.62
Cooling	Central AC	SEER 15 (CEE Tier 2)	109.25	$739.34	18	0.30	$0.63
Cooling	Central AC	SEER 16 (CEE Tier 3)	154.27	$1,109.01	18	0.28	$0.67
Cooling	Central AC	Ductless Minisplit	192.58	$2,407.07	18	0.16	$1.16
Cooling	Central AC	SEER 21	283.95	$2,820.67	18	0.21	$0.92
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	29.45	$48.98	12	-	$0.20
Cooling	Room AC	EER 11.0	34.70	$97.95	12	1.00	$0.33
Cooling	Room AC	EER 11.5	47.01	$486.70	12	0.04	$1.22
Cooling	Room AC	EER 12.0	58.30	$875.45	12	0.04	$1.77
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	36.13	$37.03	18	2.12	$0.10
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	52.79	$74.07	18	1.55	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	66.84	$111.10	18	1.31	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	78.78	$851.53	18	0.20	$1.00
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	33.01	$169.64	18	0.42	$0.48
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	58.46	$551.34	18	0.23	$0.88
Cooling	Geothermal Heat Pump	EER 30, COP 5	241.30	$1,696.44	18	0.31	$0.65
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	12.96	$17.14	15	1.30	$0.14
Cooling	PTHP	EER 10.8	30.60	$42.86	15	1.22	$0.14
Cooling	PTHP	EER 11	36.06	$51.43	15	1.20	$0.15
Cooling	PTHP	EER 11.5	48.86	$72.86	15	1.15	$0.15
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	165.10	$24.37	18	4.32	$0.01
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	301.05	$48.74	18	3.94	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	412.85	$73.11	18	3.60	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	502.60	$560.31	18	0.56	$0.10
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	106.84	$309.29	18	0.22	$0.27
Heating	Geothermal Heat Pump	EER 18, COP 3.8	185.51	$1,005.21	18	0.12	$0.50
Heating	Geothermal Heat Pump	EER 30, COP 5	1,079.39	$3,092.94	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	13.79	$17.14	15	0.41	$0.13
Heating	PTHP	EER 10.8	32.57	$42.86	15	0.39	$0.14
Heating	PTHP	EER 11	38.37	$51.43	15	0.38	$0.14
Heating	PTHP	EER 11.5	52.00	$72.86	15	0.36	$0.14
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	87.61	$100.00	13	0.43	$0.13
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	915.48	$1,575.00	13	0.31	$0.19
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,013.18	$1,703.00	13	0.32	$0.19
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	93.39	$40.00	13	1.15	$0.05
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	975.85	$574.44	13	0.93	$0.07
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,079.99	$731.11	13	0.80	$0.08
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	203.54	$54.67	4	1.00	$0.07
Interior Lighting	Screw-in	Infrared Halogen (2020)	742.69	$54.67	4	-	$0.02
Interior Lighting	Screw-in	CFL	841.96	$22.02	6	1.00	$0.01
Interior Lighting	Screw-in	LED	883.41	$1,804.28	15	0.19	$0.21
Interior Lighting	Screw-in	LED (2020)	974.56	$103.29	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	5.90	($1.64)	10	1.00	($0.04)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	12.96	$1,028.97	20	-	$7.01
Interior Lighting	Linear Fluorescent	Super T8	17.68	$13.07	10	0.31	$0.10
Interior Lighting	Linear Fluorescent	T5	17.93	$22.42	10	0.19	$0.17
Interior Lighting	Linear Fluorescent	LED (2020)	35.20	$45.16	20	-	$0.11
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	47.33	$71.60	4	0.06	$0.42
Interior Lighting	Specialty	CFL	195.80	$28.84	6	1.33	$0.03
Interior Lighting	Specialty	LED	205.44	$785.22	15	0.11	$0.39
Interior Lighting	Specialty	LED (2020)	226.64	$42.67	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	11.89	$4.39	4	1.00	$0.10
Exterior Lighting	Screw-in	Infrared Halogen (2020)	73.59	$4.39	4	-	$0.02
Exterior Lighting	Screw-in	CFL	84.95	$2.27	5	1.00	$0.01
Exterior Lighting	Screw-in	LED	92.25	$145.50	10	0.23	$0.21
Exterior Lighting	Screw-in	LED (2020)	100.12	$8.31	15	-	$0.01
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.45	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.78	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.57	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	176.94	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.51	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.34	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.21	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.11	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.69	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.22	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.81	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.49	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.94	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.93	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.65	$458.00	14	0.05	$1.24
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	22.63	$100.00	13	0.12	$0.49
Appliances	Clothes Dryer	Baseline (2015+)	23.76	$75.00	13	-	$0.35
Appliances	Clothes Dryer	High Efficiency (2015+)	53.20	$175.00	13	-	$0.37
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.59	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.24	$121.00	13	0.01	$10.90
Appliances	Stove	Halogen Burner	4.10	$580.00	13	0.00	$15.83
Appliances	Stove	Induction	23.02	$898.00	13	0.02	$4.36
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,685.07	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	229.37	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	603.36	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,573.15	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	214.57	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	465.06	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.55	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.64	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.04	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.61	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	45.45	$97.00	20	0.37	$0.19
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.46	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-6 Energy Efficiency Equipment Data, Electric Customer Only—Multi Family, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	49.50	$358.80	18	0.28	$0.67
Cooling	Central AC	SEER 15 (CEE Tier 2)	97.01	$717.59	18	0.28	$0.69
Cooling	Central AC	SEER 16 (CEE Tier 3)	136.94	$1,076.39	18	0.26	$0.73
Cooling	Central AC	Ductless Minisplit	170.96	$2,336.27	18	0.15	$1.27
Cooling	Central AC	SEER 21	252.24	$2,737.71	18	0.19	$1.01
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	28.23	$45.06	12	-	$0.19
Cooling	Room AC	EER 11.0	33.28	$90.12	12	1.00	$0.32
Cooling	Room AC	EER 11.5	45.08	$447.77	12	0.04	$1.17
Cooling	Room AC	EER 12.0	55.91	$805.42	12	0.04	$1.70
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	41.15	$41.97	18	2.13	$0.09
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	59.91	$83.95	18	1.55	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	75.67	$125.92	18	1.30	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	89.12	$965.10	18	0.20	$1.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	40.81	$192.27	18	0.46	$0.44
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	72.30	$624.88	18	0.25	$0.80
Cooling	Geothermal Heat Pump	EER 30, COP 5	301.34	$1,922.71	18	0.34	$0.59
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	12.96	$17.14	15	1.30	$0.14
Cooling	PTHP	EER 10.8	30.60	$42.86	15	1.22	$0.14
Cooling	PTHP	EER 11	36.06	$51.43	15	1.20	$0.15
Cooling	PTHP	EER 11.5	48.86	$72.86	15	1.15	$0.15
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	167.53	$27.62	18	3.87	$0.02
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	302.68	$55.24	18	3.49	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	413.49	$82.86	18	3.18	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	499.64	$635.04	18	0.49	$0.12
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	94.08	$350.55	18	0.17	$0.35
Heating	Geothermal Heat Pump	EER 18, COP 3.8	160.99	$1,139.29	18	0.09	$0.66
Heating	Geothermal Heat Pump	EER 30, COP 5	1,226.78	$3,505.51	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	13.79	$17.14	15	0.41	$0.13
Heating	PTHP	EER 10.8	32.57	$42.86	15	0.39	$0.14
Heating	PTHP	EER 11	38.37	$51.43	15	0.38	$0.14
Heating	PTHP	EER 11.5	52.00	$72.86	15	0.36	$0.14
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	79.27	$100.00	13	0.39	$0.14
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	828.29	$1,575.00	13	0.28	$0.21
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	916.69	$1,703.00	13	0.29	$0.21
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	84.50	$40.00	13	1.04	$0.05
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	882.91	$574.44	13	0.84	$0.07
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	977.14	$731.11	13	0.73	$0.08
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	189.64	$50.94	4	1.00	$0.07
Interior Lighting	Screw-in	Infrared Halogen (2020)	691.98	$50.94	4	-	$0.02
Interior Lighting	Screw-in	CFL	784.47	$20.52	6	1.00	$0.01
Interior Lighting	Screw-in	LED	823.08	$1,681.07	15	0.19	$0.21
Interior Lighting	Screw-in	LED (2020)	908.01	$96.23	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	0.18	($0.05)	10	1.00	($0.04)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	0.39	$31.19	20	-	$7.01
Interior Lighting	Linear Fluorescent	Super T8	0.54	$0.40	10	0.31	$0.10
Interior Lighting	Linear Fluorescent	T5	0.54	$0.68	10	0.19	$0.17
Interior Lighting	Linear Fluorescent	LED (2020)	1.07	$1.37	20	-	$0.11
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	47.13	$71.29	4	0.06	$0.42
Interior Lighting	Specialty	CFL	194.95	$28.72	6	1.33	$0.03
Interior Lighting	Specialty	LED	204.55	$781.82	15	0.11	$0.39
Interior Lighting	Specialty	LED (2020)	225.65	$42.48	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	11.40	$4.21	4	1.00	$0.10
Exterior Lighting	Screw-in	Infrared Halogen (2020)	70.52	$4.21	4	-	$0.02
Exterior Lighting	Screw-in	CFL	81.41	$2.17	5	1.00	$0.01
Exterior Lighting	Screw-in	LED	88.41	$139.44	10	0.23	$0.21
Exterior Lighting	Screw-in	LED (2020)	95.95	$7.97	15	-	$0.01
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.45	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.78	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.57	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	176.94	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.51	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.34	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.21	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.11	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.69	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.22	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.81	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.49	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.94	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.93	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.65	$458.00	14	0.05	$1.24
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	22.63	$100.00	13	0.12	$0.49
Appliances	Clothes Dryer	Baseline (2015+)	23.76	$75.00	13	-	$0.35
Appliances	Clothes Dryer	High Efficiency (2015+)	53.20	$175.00	13	-	$0.37
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.59	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.24	$121.00	13	0.01	$10.90
Appliances	Stove	Halogen Burner	4.10	$580.00	13	0.00	$15.83
Appliances	Stove	Induction	23.02	$898.00	13	0.02	$4.36
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,685.07	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	229.37	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	603.36	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,573.15	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	214.57	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	465.06	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.55	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.64	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.04	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.61	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	45.45	$97.00	20	0.37	$0.19
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.46	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-7 Energy Efficiency Equipment Data, Single Family Electric/Gas Customer, (Electric) Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	179.05	$381.89	18	1.01	$0.20
Cooling	Central AC	SEER 15 (CEE Tier 2)	258.28	$763.78	18	0.73	$0.27
Cooling	Central AC	SEER 16 (CEE Tier 3)	325.36	$1,145.66	18	0.61	$0.33
Cooling	Central AC	Ductless Minisplit	382.40	$2,486.63	18	0.33	$0.60
Cooling	Central AC	SEER 21	721.14	$2,913.90	18	0.53	$0.38
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	88.42	$37.13	12	-	$0.05
Cooling	Room AC	EER 11.0	104.29	$74.25	12	1.00	$0.08
Cooling	Room AC	EER 11.5	141.29	$368.94	12	0.20	$0.31
Cooling	Room AC	EER 12.0	175.22	$663.64	12	0.19	$0.45
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	121.89	$124.95	18	2.22	$0.10
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	178.10	$249.91	18	1.62	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	225.51	$374.86	18	1.37	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	265.80	$2,873.01	18	0.21	$1.00
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	91.64	$612.21	18	0.34	$0.62
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	162.28	$1,989.70	18	0.19	$1.14
Cooling	Geothermal Heat Pump	EER 30, COP 5	669.84	$6,122.15	18	0.25	$0.85
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	38.95	$17.14	15	4.09	$0.05
Cooling	PTHP	EER 10.8	91.97	$42.86	15	3.86	$0.05
Cooling	PTHP	EER 11	108.35	$51.43	15	3.79	$0.05
Cooling	PTHP	EER 11.5	146.83	$72.86	15	3.63	$0.05
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	479.24	$70.74	18	4.32	$0.01
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	873.89	$141.48	18	3.94	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,198.44	$212.21	18	3.60	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	1,458.95	$1,626.46	18	0.56	$0.10
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	248.98	$684.74	18	0.23	$0.26
Heating	Geothermal Heat Pump	EER 18, COP 3.8	432.32	$2,225.42	18	0.12	$0.48
Heating	Geothermal Heat Pump	EER 30, COP 5	2,515.43	$6,847.44	18	0.23	$0.25
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	39.11	$17.14	15	1.16	$0.05
Heating	PTHP	EER 10.8	92.34	$42.86	15	1.09	$0.05
Heating	PTHP	EER 11	108.80	$51.43	15	1.07	$0.05
Heating	PTHP	EER 11.5	147.43	$72.86	15	1.03	$0.05
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	137.26	$100.00	13	0.68	$0.08
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,435.36	$1,575.00	13	0.49	$0.12
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,588.55	$1,703.00	13	0.50	$0.12
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	146.31	$40.00	13	1.81	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,530.02	$574.44	13	1.47	$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,693.30	$731.11	13	1.26	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	292.45	$104.73	4	1.00	$0.10
Interior Lighting	Screw-in	Infrared Halogen (2020)	1,067.12	$104.73	4	-	$0.03
Interior Lighting	Screw-in	CFL	1,209.75	$42.19	6	1.00	$0.01
Interior Lighting	Screw-in	LED	1,269.29	$3,456.17	15	0.14	$0.28
Interior Lighting	Screw-in	LED (2020)	1,400.27	$197.85	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	13.07	($3.67)	10	1.00	($0.04)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	28.70	$2,311.08	20	-	$7.11
Interior Lighting	Linear Fluorescent	Super T8	39.16	$29.36	10	0.30	$0.10
Interior Lighting	Linear Fluorescent	T5	39.72	$50.36	10	0.19	$0.17
Interior Lighting	Linear Fluorescent	LED (2020)	77.96	$101.44	20	-	$0.11
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	66.18	$131.72	4	0.05	$0.55
Interior Lighting	Specialty	CFL	273.78	$53.06	6	1.01	$0.04
Interior Lighting	Specialty	LED	287.25	$1,444.60	15	0.08	$0.52
Interior Lighting	Specialty	LED (2020)	316.89	$78.50	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	27.69	$6.55	4	1.00	$0.07
Exterior Lighting	Screw-in	Infrared Halogen (2020)	171.32	$6.55	4	-	$0.01
Exterior Lighting	Screw-in	CFL	197.77	$3.38	5	1.00	$0.00
Exterior Lighting	Screw-in	LED	214.76	$217.00	10	0.35	$0.13
Exterior Lighting	Screw-in	LED (2020)	233.09	$12.40	15	-	$0.01
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.48	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.83	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.63	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	177.01	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.55	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.39	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.28	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.18	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.71	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.26	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.85	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.53	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.96	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.95	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.70	$458.00	14	0.05	$1.23
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	25.46	$100.00	13	0.13	$0.44
Appliances	Clothes Dryer	Baseline (2015+)	26.73	$75.00	13	-	$0.31
Appliances	Clothes Dryer	High Efficiency (2015+)	59.86	$175.00	13	-	$0.33
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.61	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.29	$121.00	13	0.01	$10.50
Appliances	Stove	Halogen Burner	4.25	$580.00	13	0.00	$15.26
Appliances	Stove	Induction	23.88	$898.00	13	0.02	$4.21
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,674.83	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	227.97	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	600.47	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,556.93	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	213.26	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	462.23	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.53	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.59	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.03	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.60	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	87.65	$97.00	20	0.70	$0.10
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.44	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-8 Energy Efficiency Equipment Data, Single Family Electric/Gas Customer, (Gas) - Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	53.69	$377.69	20	1.09	$0.62
Heating	Furnace	AFUE 0.92	64.12	$592.63	20	0.83	$0.82
Heating	Furnace	AFUE 0.95	78.94	$936.78	20	0.65	$1.05
Heating	Furnace	AFUE 0.97	93.47	$1,907.62	20	0.38	$1.80
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.55	$712.64	25	1.00	$37.01
Heating	Boiler	EF 0.92	16.66	$1,060.51	25	0.40	$5.11
Heating	Boiler	EF 0.95	65.08	$3,208.55	25	0.24	$3.96
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	21.21	$400.00	13	0.27	$2.11
Water Heating	Water Heater <= 55 gal	EF 0.74	35.97	$495.67	13	0.36	$1.54
Water Heating	Water Heater <= 55 gal	EF 0.76	39.92	$523.00	13	0.38	$1.47
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	55.71	$605.00	13	0.46	$1.21
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	55.78	$685.00	13	0.41	$1.37
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	22.49	$400.00	13	0.28	$1.99
Water Heating	Water Heater > 55 gal	EF 0.74	38.14	$495.67	13	0.38	$1.45
Water Heating	Water Heater > 55 gal	EF 0.76	42.32	$523.00	13	0.40	$1.38
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	59.06	$605.00	13	0.49	$1.15
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	59.13	$685.00	13	0.43	$1.30
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.78	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.88	$130.00	13	0.11	$5.05
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.62	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	7.43	$103.37	15	1.00	$1.43
Miscellaneous	Pool Heater	EF .90	21.99	$1,791.56	15	0.05	$8.37
Miscellaneous	Pool Heater	EF .95	28.93	$2,071.10	15	0.06	$7.35
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-9 Energy Efficiency Equipment Data, Single Family Electric/Gas Customer, (Electric) - New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	216.55	$479.72	18	0.97	$0.21
Cooling	Central AC	SEER 15 (CEE Tier 2)	315.32	$959.44	18	0.71	$0.28
Cooling	Central AC	SEER 16 (CEE Tier 3)	398.25	$1,439.17	18	0.59	$0.34
Cooling	Central AC	Ductless Minisplit	469.03	$3,123.66	18	0.32	$0.62
Cooling	Central AC	SEER 21	530.23	$3,660.40	18	0.31	$0.64
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	99.08	$37.13	12	-	$0.04
Cooling	Room AC	EER 11.0	116.68	$74.25	12	1.00	$0.07
Cooling	Room AC	EER 11.5	158.19	$368.94	12	0.22	$0.27
Cooling	Room AC	EER 12.0	196.19	$663.64	12	0.21	$0.40
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	138.82	$141.62	18	2.23	$0.09
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	202.14	$283.24	18	1.63	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	255.30	$424.86	18	1.37	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	300.67	$3,256.21	18	0.21	$1.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	147.28	$693.87	18	0.48	$0.44
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	260.92	$2,255.08	18	0.26	$0.80
Cooling	Geothermal Heat Pump	EER 30, COP 5	1,087.50	$6,938.71	18	0.36	$0.59
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	38.95	$17.14	15	4.09	$0.05
Cooling	PTHP	EER 10.8	91.97	$42.86	15	3.86	$0.05
Cooling	PTHP	EER 11	108.35	$51.43	15	3.79	$0.05
Cooling	PTHP	EER 11.5	146.83	$72.86	15	3.63	$0.05
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	486.32	$80.17	18	3.87	$0.02
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	878.61	$160.35	18	3.49	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	1,200.29	$240.52	18	3.18	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	1,450.36	$1,843.40	18	0.49	$0.12
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	208.27	$776.08	18	0.17	$0.35
Heating	Geothermal Heat Pump	EER 18, COP 3.8	356.42	$2,522.27	18	0.09	$0.66
Heating	Geothermal Heat Pump	EER 30, COP 5	2,715.95	$7,760.82	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	39.11	$17.14	15	1.16	$0.05
Heating	PTHP	EER 10.8	92.34	$42.86	15	1.09	$0.05
Heating	PTHP	EER 11	108.80	$51.43	15	1.07	$0.05
Heating	PTHP	EER 11.5	147.43	$72.86	15	1.03	$0.05
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	124.19	$100.00	13	0.61	$0.09
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,298.66	$1,575.00	13	0.44	$0.14
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,437.26	$1,703.00	13	0.45	$0.13
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	132.38	$40.00	13	1.64	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,384.30	$574.44	13	1.33	$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,532.03	$731.11	13	1.14	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	262.31	$93.93	4	1.00	$0.10
Interior Lighting	Screw-in	Infrared Halogen (2020)	957.13	$93.93	4	-	$0.03
Interior Lighting	Screw-in	CFL	1,085.06	$37.84	6	1.00	$0.01
Interior Lighting	Screw-in	LED	1,138.47	$3,099.94	15	0.14	$0.28
Interior Lighting	Screw-in	LED (2020)	1,255.94	$177.46	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	T8	1.11	($0.31)	10	1.00	($0.04)
Interior Lighting	Linear Fluorescent	LED (2011)	2.44	$196.31	20	-	$7.11
Interior Lighting	Linear Fluorescent	Super T8	3.33	$2.49	10	0.30	$0.10
Interior Lighting	Linear Fluorescent	T5	3.37	$4.28	10	0.19	$0.17
Interior Lighting	Linear Fluorescent	LED (2020)	6.62	$8.62	20	-	$0.11
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	65.67	$130.71	4	0.05	$0.55
Interior Lighting	Specialty	CFL	271.67	$52.66	6	1.01	$0.04
Interior Lighting	Specialty	LED	285.04	$1,433.48	15	0.08	$0.52
Interior Lighting	Specialty	LED (2020)	314.45	$77.89	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	25.91	$6.13	4	1.00	$0.07
Exterior Lighting	Screw-in	Infrared Halogen (2020)	160.29	$6.13	4	-	$0.01
Exterior Lighting	Screw-in	CFL	185.03	$3.16	5	1.00	$0.00
Exterior Lighting	Screw-in	LED	200.94	$203.03	10	0.35	$0.13
Exterior Lighting	Screw-in	LED (2020)	218.08	$11.60	15	-	$0.01
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.48	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.83	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.63	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	177.01	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.55	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.39	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.28	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.18	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.71	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.26	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.85	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.53	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.96	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.95	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.70	$458.00	14	0.05	$1.23
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	25.46	$100.00	13	0.13	$0.44
Appliances	Clothes Dryer	Baseline (2015+)	26.73	$75.00	13	-	$0.31
Appliances	Clothes Dryer	High Efficiency (2015+)	59.86	$175.00	13	-	$0.33
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.61	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.29	$121.00	13	0.01	$10.50
Appliances	Stove	Halogen Burner	4.25	$580.00	13	0.00	$15.26
Appliances	Stove	Induction	23.88	$898.00	13	0.02	$4.21
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,674.83	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	227.97	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	600.47	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,556.93	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	213.26	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	462.23	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.53	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.59	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.03	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.60	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	87.65	$97.00	20	0.70	$0.10
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.44	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-10 Energy Efficiency Equipment Data, Single Family Electric/Gas Customer, (Gas) - New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	54.32	$430.38	20	0.97	$0.70
Heating	Furnace	AFUE 0.92	64.83	$675.30	20	0.74	$0.92
Heating	Furnace	AFUE 0.95	79.77	$1,067.46	20	0.58	$1.18
Heating	Furnace	AFUE 0.97	94.25	$2,173.74	20	0.33	$2.04
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	2.58	$812.05	25	1.00	$25.30
Heating	Boiler	EF 0.92	28.05	$1,208.45	25	0.60	$3.46
Heating	Boiler	EF 0.95	109.33	$3,656.14	25	0.35	$2.68
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	19.19	$400.00	13	0.24	$2.33
Water Heating	Water Heater <= 55 gal	EF 0.74	32.54	$495.67	13	0.33	$1.70
Water Heating	Water Heater <= 55 gal	EF 0.76	36.12	$523.00	13	0.35	$1.62
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	50.40	$605.00	13	0.42	$1.34
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	50.46	$685.00	13	0.37	$1.52
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	20.35	$400.00	13	0.25	$2.20
Water Heating	Water Heater > 55 gal	EF 0.74	34.50	$495.67	13	0.35	$1.61
Water Heating	Water Heater > 55 gal	EF 0.76	38.29	$523.00	13	0.37	$1.53
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	53.44	$605.00	13	0.44	$1.27
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	53.50	$685.00	13	0.39	$1.43
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.78	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.88	$130.00	13	0.11	$5.05
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.62	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	7.43	$103.37	15	1.00	$1.43
Miscellaneous	Pool Heater	EF .90	21.99	$1,791.56	15	0.05	$8.37
Miscellaneous	Pool Heater	EF .95	28.93	$2,071.10	15	0.06	$7.35
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-11 Energy Efficiency Equipment Data, Multi Family Electric/Gas Customer, (Electric) - Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	125.23	$831.76	18	0.31	$0.62
Cooling	Central AC	SEER 15 (CEE Tier 2)	245.82	$1,663.51	18	0.30	$0.63
Cooling	Central AC	SEER 16 (CEE Tier 3)	347.11	$2,495.27	18	0.28	$0.67
Cooling	Central AC	Ductless Minisplit	433.30	$5,415.91	18	0.16	$1.16
Cooling	Central AC	SEER 21	638.89	$6,346.52	18	0.21	$0.92
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	66.27	$110.20	12	-	$0.20
Cooling	Room AC	EER 11.0	78.08	$220.39	12	1.00	$0.33
Cooling	Room AC	EER 11.5	105.77	$1,095.08	12	0.04	$1.22
Cooling	Room AC	EER 12.0	131.18	$1,969.77	12	0.04	$1.77
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	81.29	$83.33	18	2.12	$0.10
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	118.77	$166.66	18	1.55	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	150.38	$249.98	18	1.31	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	177.25	$1,915.94	18	0.20	$1.00
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	74.27	$381.70	18	0.42	$0.48
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	131.53	$1,240.52	18	0.23	$0.88
Cooling	Geothermal Heat Pump	EER 30, COP 5	542.92	$3,817.00	18	0.31	$0.65
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	29.16	$17.14	15	2.92	$0.06
Cooling	PTHP	EER 10.8	68.86	$42.86	15	2.75	$0.06
Cooling	PTHP	EER 11	81.12	$51.43	15	2.70	$0.07
Cooling	PTHP	EER 11.5	109.93	$72.86	15	2.59	$0.07
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	330.19	$48.74	18	4.32	$0.01
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	602.10	$97.48	18	3.94	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	825.71	$146.21	18	3.60	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	1,005.20	$1,120.61	18	0.56	$0.10
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	213.68	$618.59	18	0.22	$0.27
Heating	Geothermal Heat Pump	EER 18, COP 3.8	371.03	$2,010.41	18	0.12	$0.50
Heating	Geothermal Heat Pump	EER 30, COP 5	2,158.79	$6,185.88	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	27.59	$17.14	15	0.82	$0.06
Heating	PTHP	EER 10.8	65.14	$42.86	15	0.77	$0.07
Heating	PTHP	EER 11	76.74	$51.43	15	0.76	$0.07
Heating	PTHP	EER 11.5	103.99	$72.86	15	0.72	$0.07
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	134.00	$100.00	13	0.66	$0.08
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,400.15	$1,575.00	13	0.47	$0.13
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,549.57	$1,703.00	13	0.48	$0.12
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	142.83	$40.00	13	1.76	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,492.48	$574.44	13	1.43	$0.04
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,651.76	$731.11	13	1.23	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	236.88	$68.18	4	1.00	$0.08
Interior Lighting	Screw-in	Infrared Halogen (2020)	864.36	$68.18	4	-	$0.02
Interior Lighting	Screw-in	CFL	979.89	$27.46	6	1.00	$0.01
Interior Lighting	Screw-in	LED	1,028.12	$2,249.92	15	0.18	$0.22
Interior Lighting	Screw-in	LED (2020)	1,134.21	$128.80	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	T8	5.99	($1.00)	10	1.00	($0.02)
Interior Lighting	Linear Fluorescent	LED (2011)	13.15	$626.83	20	-	$4.21
Interior Lighting	Linear Fluorescent	Super T8	17.95	$7.96	10	0.51	$0.06
Interior Lighting	Linear Fluorescent	T5	18.21	$13.66	10	0.32	$0.10
Interior Lighting	Linear Fluorescent	LED (2020)	35.73	$27.51	20	-	$0.07
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	54.23	$86.84	4	0.06	$0.44
Interior Lighting	Specialty	CFL	224.35	$34.98	6	1.26	$0.03
Interior Lighting	Specialty	LED	235.39	$952.40	15	0.10	$0.42
Interior Lighting	Specialty	LED (2020)	259.68	$51.75	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	12.96	$12.87	4	1.00	$0.27
Exterior Lighting	Screw-in	Infrared Halogen (2020)	80.18	$12.87	4	-	$0.04
Exterior Lighting	Screw-in	CFL	92.56	$6.64	5	1.00	$0.02
Exterior Lighting	Screw-in	LED	100.52	$426.37	10	0.08	$0.56
Exterior Lighting	Screw-in	LED (2020)	109.09	$24.36	15	-	$0.02
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.45	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.78	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.57	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	176.94	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.51	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.34	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.21	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.11	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.69	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.22	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.81	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.49	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.94	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.93	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.65	$458.00	14	0.05	$1.24
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	22.63	$100.00	13	0.12	$0.49
Appliances	Clothes Dryer	Baseline (2015+)	23.76	$75.00	13	-	$0.35
Appliances	Clothes Dryer	High Efficiency (2015+)	53.20	$175.00	13	-	$0.37
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.59	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.24	$121.00	13	0.01	$10.90
Appliances	Stove	Halogen Burner	4.10	$580.00	13	0.00	$15.83
Appliances	Stove	Induction	23.02	$898.00	13	0.02	$4.36
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,685.07	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	229.37	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	603.36	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,573.15	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	214.57	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	465.06	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.55	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.64	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.04	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.61	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	45.45	$97.00	20	0.37	$0.19
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.46	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-12 Energy Efficiency Equipment Data, Multi Family Electric/Gas Customer, (Gas) Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	41.00	$374.93	20	0.84	$0.81
Heating	Furnace	AFUE 0.92	48.93	$588.30	20	0.64	$1.06
Heating	Furnace	AFUE 0.95	60.20	$929.93	20	0.50	$1.36
Heating	Furnace	AFUE 0.97	71.13	$1,893.68	20	0.29	$2.35
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.21	$724.80	25	1.00	$48.26
Heating	Boiler	EF 0.92	12.99	$1,078.61	25	0.31	$6.66
Heating	Boiler	EF 0.95	50.76	$3,263.30	25	0.18	$5.16
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	15.49	$400.00	13	0.19	$2.89
Water Heating	Water Heater <= 55 gal	EF 0.74	26.28	$495.67	13	0.27	$2.11
Water Heating	Water Heater <= 55 gal	EF 0.76	29.02	$523.00	13	0.28	$2.02
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	40.73	$605.00	13	0.34	$1.66
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	40.74	$685.00	13	0.30	$1.88
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	16.43	$400.00	13	0.21	$2.72
Water Heating	Water Heater > 55 gal	EF 0.74	27.86	$495.67	13	0.28	$1.99
Water Heating	Water Heater > 55 gal	EF 0.76	30.76	$523.00	13	0.29	$1.90
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	43.19	$605.00	13	0.36	$1.57
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	43.19	$685.00	13	0.32	$1.77
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.61	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.25	$130.00	13	0.09	$6.47
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.63	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	2.60	$103.37	15	1.00	$4.08
Miscellaneous	Pool Heater	EF .90	7.70	$1,791.56	15	0.02	$23.90
Miscellaneous	Pool Heater	EF .95	10.13	$2,071.10	15	0.02	$21.00
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-13 Energy Efficiency Equipment Data, Multi Family Electric/Gas Customer, (Electric) - New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Central AC	SEER 13	-	-	18	1.00	-
Cooling	Central AC	SEER 14.5 (Energy Star)	111.37	$807.29	18	0.28	$0.67
Cooling	Central AC	SEER 15 (CEE Tier 2)	218.27	$1,614.59	18	0.28	$0.69
Cooling	Central AC	SEER 16 (CEE Tier 3)	308.12	$2,421.88	18	0.26	$0.73
Cooling	Central AC	Ductless Minisplit	384.67	$5,256.62	18	0.15	$1.27
Cooling	Central AC	SEER 21	567.53	$6,159.86	18	0.19	$1.01
Cooling	Room AC	EER 9.8	-	-	12	-	-
Cooling	Room AC	EER 10.8 (Energy Star)	63.52	$101.38	12	-	$0.19
Cooling	Room AC	EER 11.0	74.87	$202.76	12	1.00	$0.32
Cooling	Room AC	EER 11.5	101.44	$1,007.47	12	0.04	$1.17
Cooling	Room AC	EER 12.0	125.80	$1,812.18	12	0.04	$1.70
Cooling	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Cooling	Air-Source Heat Pump	SEER 14, HSPF 8.0	92.58	$94.44	18	2.13	$0.09
Cooling	Air-Source Heat Pump	SEER 15, HSPF 8.2	134.80	$188.88	18	1.55	$0.13
Cooling	Air-Source Heat Pump	SEER 16, HSPF 8.5	170.25	$283.33	18	1.30	$0.15
Cooling	Air-Source Heat Pump	Ductless Minisplit	200.51	$2,171.48	18	0.20	$1.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	91.82	$432.61	18	0.46	$0.44
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	162.67	$1,405.98	18	0.25	$0.80
Cooling	Geothermal Heat Pump	EER 30, COP 5	678.02	$4,326.10	18	0.34	$0.59
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	29.16	$17.14	15	2.92	$0.06
Cooling	PTHP	EER 10.8	68.86	$42.86	15	2.75	$0.06
Cooling	PTHP	EER 11	81.12	$51.43	15	2.70	$0.07
Cooling	PTHP	EER 11.5	109.93	$72.86	15	2.59	$0.07
Heating	Furnace	Standard	-	-	15	1.00	-
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Air-Source Heat Pump	SEER 13, HSPF 7.7	-	-	18	1.00	-
Heating	Air-Source Heat Pump	SEER 14, HSPF 8.0	335.07	$55.24	18	3.87	$0.02
Heating	Air-Source Heat Pump	SEER 15, HSPF 8.2	605.35	$110.48	18	3.49	$0.02
Heating	Air-Source Heat Pump	SEER 16, HSPF 8.5	826.99	$165.71	18	3.18	$0.02
Heating	Air-Source Heat Pump	Ductless Minisplit	999.28	$1,270.08	18	0.49	$0.12
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	18	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	188.15	$701.10	18	0.17	$0.35
Heating	Geothermal Heat Pump	EER 18, COP 3.8	321.99	$2,278.58	18	0.09	$0.66
Heating	Geothermal Heat Pump	EER 30, COP 5	2,453.56	$7,011.02	18	0.22	$0.27
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	27.59	$17.14	15	0.82	$0.06
Heating	PTHP	EER 10.8	65.14	$42.86	15	0.77	$0.07
Heating	PTHP	EER 11	76.74	$51.43	15	0.76	$0.07
Heating	PTHP	EER 11.5	103.99	$72.86	15	0.72	$0.07
Water Heating	Water Heater <= 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.95	121.23	$100.00	13	0.60	$0.09
Water Heating	Water Heater <= 55 gal	EF 2.0 (HP)	1,266.80	$1,575.00	13	0.43	$0.14
Water Heating	Water Heater <= 55 gal	EF 2.3 (HP)	1,401.99	$1,703.00	13	0.44	$0.14
Water Heating	Water Heater > 55 gal	EF 0.9	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.95	129.23	$40.00	13	1.59	$0.03
Water Heating	Water Heater > 55 gal	EF 2.0 (HP)	1,350.34	$574.44	13	1.29	$0.05
Water Heating	Water Heater > 55 gal	EF 2.3 (HP)	1,494.45	$731.11	13	1.11	$0.05
Interior Lighting	Screw-in	Incandescent	-	-	3	-	-
Interior Lighting	Screw-in	Infrared Halogen	225.40	$64.87	4	1.00	$0.08
Interior Lighting	Screw-in	Infrared Halogen (2020)	822.47	$64.87	4	-	$0.02
Interior Lighting	Screw-in	CFL	932.40	$26.13	6	1.00	$0.01
Interior Lighting	Screw-in	LED	978.30	$2,140.88	15	0.18	$0.22
Interior Lighting	Screw-in	LED (2020)	1,079.24	$122.55	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	T8	0.40	($0.07)	10	1.00	($0.02)

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Linear Fluorescent	LED (2011)	0.87	$41.39	20	-	$4.21
Interior Lighting	Linear Fluorescent	Super T8	1.19	$0.53	10	0.51	$0.06
Interior Lighting	Linear Fluorescent	T5	1.20	$0.90	10	0.32	$0.10
Interior Lighting	Linear Fluorescent	LED (2020)	2.36	$1.82	20	-	$0.07
Interior Lighting	Specialty	Incandescent	-	-	3	1.00	-
Interior Lighting	Specialty	Infrared Halogen	54.20	$86.78	4	0.06	$0.44
Interior Lighting	Specialty	CFL	224.19	$34.96	6	1.26	$0.03
Interior Lighting	Specialty	LED	235.22	$951.72	15	0.10	$0.42
Interior Lighting	Specialty	LED (2020)	259.49	$51.71	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	3	-	-
Exterior Lighting	Screw-in	Infrared Halogen	12.42	$12.34	4	1.00	$0.27
Exterior Lighting	Screw-in	Infrared Halogen (2020)	76.84	$12.34	4	-	$0.04
Exterior Lighting	Screw-in	CFL	88.70	$6.36	5	1.00	$0.02
Exterior Lighting	Screw-in	LED	96.33	$408.60	10	0.08	$0.56
Exterior Lighting	Screw-in	LED (2020)	104.55	$23.35	15	-	$0.02
Appliances	Refrigerator	Standard	-	-	12	-	-
Appliances	Refrigerator	Energy Star	97.45	$30.00	12	-	$0.04
Appliances	Refrigerator	High Efficiency	130.78	$500.00	12	-	$0.45
Appliances	Refrigerator	AHAM (2014)	155.57	$293.00	12	1.00	$0.22
Appliances	Refrigerator	High Efficiency (2014)	176.94	$770.00	12	0.02	$0.51
Appliances	Second Refrigerator	Standard	-	-	12	-	-
Appliances	Second Refrigerator	Energy Star	113.51	$30.00	12	-	$0.03
Appliances	Second Refrigerator	High Efficiency	152.34	$500.00	12	-	$0.39
Appliances	Second Refrigerator	AHAM (2014)	181.21	$293.00	12	1.00	$0.19
Appliances	Second Refrigerator	High Efficiency (2014)	206.11	$770.00	12	0.03	$0.44
Appliances	Freezer	Standard	-	-	11	-	-
Appliances	Freezer	Energy Star	46.69	$35.00	11	-	$0.09
Appliances	Freezer	High Efficiency	77.22	$300.00	11	-	$0.48
Appliances	Freezer	AHAM (2014)	80.81	$356.27	11	1.00	$0.55
Appliances	Freezer	High Efficiency (2014)	92.49	$550.00	11	0.03	$0.74
Appliances	Clothes Washer	Standard (1.26)	-	-	14	1.00	-
Appliances	Clothes Washer	ENERGY STAR(1.72)	11.94	$141.66	14	-	$1.27
Appliances	Clothes Washer	ENERGY STAR(MEF 2.0)	19.93	$210.00	14	0.05	$1.13
Appliances	Clothes Washer	Compact (MEF 2.79)	39.65	$458.00	14	0.05	$1.24
Appliances	Clothes Dryer	Baseline	-	-	13	1.00	-
Appliances	Clothes Dryer	High Efficiency	22.63	$100.00	13	0.12	$0.49
Appliances	Clothes Dryer	Baseline (2015+)	23.76	$75.00	13	-	$0.35
Appliances	Clothes Dryer	High Efficiency (2015+)	53.20	$175.00	13	-	$0.37
Appliances	Dishwasher	Standard (EF 0.63)	-	-	13	-	-
Appliances	Dishwasher	ENERGY STAR(EF 0.73)	42.83	$50.00	13	-	$0.13
Appliances	Dishwasher	AHAM (EF 0.73)	42.83	$50.00	13	1.00	$0.13
Appliances	Dishwasher	Ultra Efficient (EF 1.1)	185.59	$425.00	13	0.20	$0.26
Appliances	Stove	Standard	-	-	13	1.00	-
Appliances	Stove	Convection	1.24	$121.00	13	0.01	$10.90
Appliances	Stove	Halogen Burner	4.10	$580.00	13	0.00	$15.83
Appliances	Stove	Induction	23.02	$898.00	13	0.02	$4.36
Appliances	Microwave	Standard	-	-	9	1.00	-
Electronics	Personal Computers	Standard	-	-	5	1.00	-
Electronics	Personal Computers	Energy Star	91.86	$0.01	5	1,685.07	$0.00
Electronics	Monitor	Standard	-	-	5	1.00	-
Electronics	Monitor	Energy Star	12.50	$0.01	5	229.37	$0.00
Electronics	Laptops	Standard	-	-	4	1.00	-
Electronics	Laptops	Energy Star	42.32	$0.01	4	603.36	$0.00
Electronics	TVs	Standard	-	-	11	1.00	-
Electronics	TVs	ENERGY STAR(3.1)	46.21	$0.01	11	-	$0.00
Electronics	TVs	ENERGY STAR(4.1)	98.90	$0.02	11	-	$0.00
Electronics	TVs	ENERGY STAR(5.1)	111.37	$0.03	11	1,573.15	$0.00
Electronics	Printer/Fax/Copier	Standard	-	-	5	1.00	-
Electronics	Printer/Fax/Copier	Energy Star	11.70	$0.01	5	214.57	$0.00
Electronics	Set-top Boxes/DVR	Standard	-	-	5	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Electronics	Set-top Boxes/DVR	ENERGY STAR(2009)	38.03	$0.01	5	-	$0.00
Electronics	Set-top Boxes/DVR	ENERGY STAR(2011)	50.71	$0.02	5	465.06	$0.00
Electronics	Devices and Gadgets	Standard	-	-	5	1.00	-
Miscellaneous	Air Purifier/Cleaner	Standard	-	-	9	1.00	-
Miscellaneous	Air Purifier/Cleaner	Energy Star	498.75	$70.00	9	2.55	$0.02
Miscellaneous	Dehumidifier	Standard	-	-	12	1.00	-
Miscellaneous	Dehumidifier	Energy Star	434.15	$45.00	12	4.64	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	146.94	$85.00	15	1.04	$0.06
Miscellaneous	Pool Pump	Two-Speed	587.75	$579.00	15	0.61	$0.10
Miscellaneous	Pool Heater	Electric Resistance	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump (COP = 5.0)	3,579.82	$2,550.00	15	0.84	$0.07
Miscellaneous	Hot Tub / Spa	Standard	-	-	15	1.00	-
Miscellaneous	Hot Tub / Spa	Efficient Pumps	135.38	$300.00	15	0.27	$0.23
Miscellaneous	Hot Tub / Spa	Improved Controls and Pumps	180.50	$350.00	15	0.31	$0.20
Miscellaneous	Well Pump	Standard	-	-	5	1.00	-
Miscellaneous	Furnace Fan	Standard	-	-	20	1.00	-
Miscellaneous	Furnace Fan	ECM	45.45	$97.00	20	0.37	$0.19
Miscellaneous	Bathroom Exhaust Fan	Standard	-	-	19	1.00	-
Miscellaneous	Bathroom Exhaust Fan	High Efficiency	84.55	$43.50	19	1.46	$0.05
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-14 Energy Efficiency Equipment Data, Multi Family Electric/Gas Customer, (Gas) - New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	29.24	$382.99	20	0.59	$1.16
Heating	Furnace	AFUE 0.92	34.91	$600.94	20	0.45	$1.52
Heating	Furnace	AFUE 0.95	42.96	$949.92	20	0.35	$1.95
Heating	Furnace	AFUE 0.97	50.84	$1,934.38	20	0.20	$3.36
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.39	$723.30	25	1.00	$41.75
Heating	Boiler	EF 0.92	15.14	$1,076.38	25	0.36	$5.71
Heating	Boiler	EF 0.95	59.02	$3,256.55	25	0.21	$4.43
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	14.56	$400.00	13	0.18	$3.07
Water Heating	Water Heater <= 55 gal	EF 0.74	24.70	$495.67	13	0.25	$2.25
Water Heating	Water Heater <= 55 gal	EF 0.76	27.26	$523.00	13	0.26	$2.15
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	38.28	$605.00	13	0.32	$1.77
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	38.28	$685.00	13	0.28	$2.00
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	15.44	$400.00	13	0.19	$2.90
Water Heating	Water Heater > 55 gal	EF 0.74	26.18	$495.67	13	0.26	$2.12
Water Heating	Water Heater > 55 gal	EF 0.76	28.90	$523.00	13	0.28	$2.02
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	40.58	$605.00	13	0.34	$1.67
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	40.58	$685.00	13	0.30	$1.89
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.61	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.25	$130.00	13	0.09	$6.47
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.63	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	2.60	$103.37	15	1.00	$4.08
Miscellaneous	Pool Heater	EF .90	7.70	$1,791.56	15	0.02	$23.90
Miscellaneous	Pool Heater	EF .95	10.13	$2,071.10	15	0.02	$21.00
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-15 Energy Efficiency Equipment Data, Single Family Gas Customer Only, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	49.56	$348.64	20	1.09	$0.62
Heating	Furnace	AFUE 0.92	59.19	$547.04	20	0.83	$0.82
Heating	Furnace	AFUE 0.95	72.86	$864.72	20	0.65	$1.05
Heating	Furnace	AFUE 0.97	86.28	$1,760.88	20	0.38	$1.80
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.43	$657.82	25	1.00	$37.01
Heating	Boiler	EF 0.92	15.38	$978.93	25	0.40	$5.11
Heating	Boiler	EF 0.95	60.07	$2,961.74	25	0.24	$3.96
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	19.58	$400.00	13	0.24	$2.29
Water Heating	Water Heater <= 55 gal	EF 0.74	33.20	$495.67	13	0.33	$1.67
Water Heating	Water Heater <= 55 gal	EF 0.76	36.85	$523.00	13	0.35	$1.59
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	51.42	$605.00	13	0.42	$1.32
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	51.49	$685.00	13	0.38	$1.49
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	20.76	$400.00	13	0.26	$2.16
Water Heating	Water Heater > 55 gal	EF 0.74	35.20	$495.67	13	0.35	$1.58
Water Heating	Water Heater > 55 gal	EF 0.76	39.07	$523.00	13	0.37	$1.50
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	54.52	$605.00	13	0.45	$1.24
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	54.58	$685.00	13	0.40	$1.40
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.78	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.88	$130.00	13	0.11	$5.05
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.62	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	7.43	$103.37	15	1.00	$1.43
Miscellaneous	Pool Heater	EF .90	21.99	$1,791.56	15	0.05	$8.37
Miscellaneous	Pool Heater	EF .95	28.93	$2,071.10	15	0.06	$7.35
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-16 Energy Efficiency Equipment Data, Single Family Gas Customer Only, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	50.14	$397.28	20	0.97	$0.70
Heating	Furnace	AFUE 0.92	59.85	$623.36	20	0.74	$0.92
Heating	Furnace	AFUE 0.95	73.63	$985.35	20	0.58	$1.18
Heating	Furnace	AFUE 0.97	87.00	$2,006.53	20	0.33	$2.04
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	2.38	$749.58	25	1.00	$25.30
Heating	Boiler	EF 0.92	25.89	$1,115.49	25	0.60	$3.46
Heating	Boiler	EF 0.95	100.92	$3,374.90	25	0.35	$2.68
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	17.72	$400.00	13	0.22	$2.53
Water Heating	Water Heater <= 55 gal	EF 0.74	30.04	$495.67	13	0.30	$1.85
Water Heating	Water Heater <= 55 gal	EF 0.76	33.34	$523.00	13	0.32	$1.76
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	46.53	$605.00	13	0.38	$1.45
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	46.58	$685.00	13	0.34	$1.65
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	18.78	$400.00	13	0.23	$2.38
Water Heating	Water Heater > 55 gal	EF 0.74	31.85	$495.67	13	0.32	$1.74
Water Heating	Water Heater > 55 gal	EF 0.76	35.34	$523.00	13	0.34	$1.66
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	49.33	$605.00	13	0.41	$1.37
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	49.39	$685.00	13	0.36	$1.55
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.78	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.88	$130.00	13	0.11	$5.05
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.62	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	7.43	$103.37	15	1.00	$1.43
Miscellaneous	Pool Heater	EF .90	21.99	$1,791.56	15	0.05	$8.37
Miscellaneous	Pool Heater	EF .95	28.93	$2,071.10	15	0.06	$7.35
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-17 Energy Efficiency Equipment Data, Multi Family Gas Customer Only, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therm/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	34.65	$316.84	20	0.84	$0.81
Heating	Furnace	AFUE 0.92	41.35	$497.15	20	0.64	$1.06
Heating	Furnace	AFUE 0.95	50.87	$785.86	20	0.50	$1.36
Heating	Furnace	AFUE 0.97	60.11	$1,600.29	20	0.29	$2.35
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.02	$612.50	25	1.00	$48.26
Heating	Boiler	EF 0.92	10.98	$911.50	25	0.31	$6.66
Heating	Boiler	EF 0.95	42.90	$2,757.72	25	0.18	$5.16
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	13.67	$400.00	13	0.17	$3.27
Water Heating	Water Heater <= 55 gal	EF 0.74	23.19	$495.67	13	0.23	$2.39
Water Heating	Water Heater <= 55 gal	EF 0.76	25.60	$523.00	13	0.24	$2.29
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	35.94	$605.00	13	0.30	$1.88
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	35.95	$685.00	13	0.26	$2.13
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	14.49	$400.00	13	0.18	$3.09
Water Heating	Water Heater > 55 gal	EF 0.74	24.59	$495.67	13	0.25	$2.26
Water Heating	Water Heater > 55 gal	EF 0.76	27.14	$523.00	13	0.26	$2.16
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	38.10	$605.00	13	0.31	$1.78
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	38.11	$685.00	13	0.28	$2.01
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.61	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.25	$130.00	13	0.09	$6.47
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.63	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	2.60	$103.37	15	1.00	$4.08
Miscellaneous	Pool Heater	EF .90	7.70	$1,791.56	15	0.02	$23.90
Miscellaneous	Pool Heater	EF .95	10.13	$2,071.10	15	0.02	$21.00
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-18 Energy Efficiency Equipment Data, Multi Family Gas Customer Only, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/HH/yr)	Incremental Cost ($/HH)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	AFUE 0.8	-	-	20	1.00	-
Heating	Furnace	AFUE 0.9	24.71	$323.65	20	0.59	$1.16
Heating	Furnace	AFUE 0.92	29.50	$507.84	20	0.45	$1.52
Heating	Furnace	AFUE 0.95	36.31	$802.75	20	0.35	$1.95
Heating	Furnace	AFUE 0.97	42.96	$1,634.68	20	0.20	$3.36
Heating	Boiler	EF 0.8	-	-	25	-	-
Heating	Boiler	EF 0.9	1.18	$611.24	25	1.00	$41.75
Heating	Boiler	EF 0.92	12.80	$909.61	25	0.36	$5.71
Heating	Boiler	EF 0.95	49.87	$2,752.01	25	0.21	$4.43
Heating	Other Heating	Gas Fireplace	-	-	5	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater <= 55 gal	EF 0.67	12.85	$400.00	13	0.16	$3.48
Water Heating	Water Heater <= 55 gal	EF 0.74	21.79	$495.67	13	0.22	$2.54
Water Heating	Water Heater <= 55 gal	EF 0.76	24.06	$523.00	13	0.23	$2.43
Water Heating	Water Heater <= 55 gal	EF 0.82 (Tankless)	33.77	$605.00	13	0.28	$2.00
Water Heating	Water Heater <= 55 gal	EF 0.86 (Condensing)	33.78	$685.00	13	0.25	$2.27
Water Heating	Water Heater > 55 gal	EF 0.59	-	-	13	1.00	-
Water Heating	Water Heater > 55 gal	EF 0.67	13.62	$400.00	13	0.17	$3.29
Water Heating	Water Heater > 55 gal	EF 0.74	23.10	$495.67	13	0.23	$2.40
Water Heating	Water Heater > 55 gal	EF 0.76	25.50	$523.00	13	0.24	$2.29
Water Heating	Water Heater > 55 gal	EF 0.82 (Tankless)	35.80	$605.00	13	0.30	$1.89
Water Heating	Water Heater > 55 gal	EF 0.86 (Condensing)	35.81	$685.00	13	0.26	$2.14
Appliances	Clothes Dryer	Standard	-	-	13	1.00	-
Appliances	Clothes Dryer	Standard (AHAM)	0.61	-	13	-	-
Appliances	Clothes Dryer	Efficient	2.25	$130.00	13	0.09	$6.47
Appliances	Stove	Standard (EF .399)	-	-	13	1.00	-
Appliances	Stove	Efficient (EF .42)	2.63	$115.00	13	0.11	$4.90
Miscellaneous	Pool Heater	EF .78	-	-	15	-	-
Miscellaneous	Pool Heater	EF .82	2.60	$103.37	15	1.00	$4.08
Miscellaneous	Pool Heater	EF .90	7.70	$1,791.56	15	0.02	$23.90
Miscellaneous	Pool Heater	EF .95	10.13	$2,071.10	15	0.02	$21.00
Miscellaneous	Hot Tub / Spa	EF .78	-	-	15	-	-
Miscellaneous	Hot Tub / Spa	EF .82	2.51	$103.37	15	1.00	$4.23
Miscellaneous	Hot Tub / Spa	EF .90	7.42	$1,791.56	15	0.02	$24.78
Miscellaneous	Hot Tub / Spa	EF .95	9.77	$2,071.10	15	0.02	$21.76
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table B-19 Energy Efficiency Non-Equipment Data, Single Family Electric Customer Only, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	33%	38%	20	$363.42	2,152.72	1.29	$0.055
Insulation - Ducting	15%	75%	20	$95.00	2,546.31	11.81	$0.020
Insulation - Foundation	33%	50%	20	$582.88	-	-	$-
Insulation - Infiltration Control	46%	90%	15	$327.87	5,296.53	2.15	$0.032
Insulation - Radiant Barrier	5%	90%	20	$82.84	2,019.30	5.30	$0.023
Insulation - Wall Cavity	33%	50%	20	$6,048.96	4,408.00	0.15	$0.088
Insulation - Wall Sheathing	33%	80%	20	$4,435.90	9,810.49	0.48	$0.074
Ducting - Repair and Sealing	16%	50%	18	$497.62	17,220.63	10.78	$0.018
Windows - High Efficiency/ENERGY STAR	47%	90%	20	$7,134.01	8,580.43	0.48	$0.087
Windows - Install Reflective Film	5%	45%	10	$1,028.88	8,450.80	1.18	$0.070
Doors - Storm and Thermal	38%	75%	25	$133.00	1,252.77	2.99	$0.041
Roofs - High Reflectivity	5%	10%	20	$85.51	1,133.43	5.51	$0.044
Attic Fan - Installation	12%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	13%	45%	20	$461.52	34.74	0.03	$0.096
Whole-House Fan - Installation	4%	19%	20	$546.45	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	3,361.21	2.36	$0.045
Thermostat - Clock/Programmable	51%	56%	5	$30.00	6,055.91	5.81	$0.003
Home Energy Management System	20%	38%	15	$1,747.00	7,199.97	0.56	$0.071
Central AC - Early Replacement	37%	100%	15	$3,373.96	5,513.32	0.44	$0.097
Central AC - Maintenance and Tune-Up	37%	100%	2	$175.00	1,531.48	0.07	$0.109
Central Heat Pump - Maintenance	3%	90%	2	$175.00	10,040.61	0.34	$0.018
Room AC - Removal of Second Unit	0%	38%	4	$60.00	11,979.02	6.14	$0.005
Boiler - Hot Water Reset	14%	56%	11	$37.00	-	15.16	$0.003
Boiler - Pipe Insulation	16%	38%	9	$891.26	-	0.16	$0.101
Boiler - Maintenance	32%	100%	10	$215.00	2,725.25	0.74	$0.053
Furnace - Maintenance	32%	100%	15	$215.00	-	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	8,501.83	4.98	$0.016
Water Heater - Faucet Aerators	25%	90%	9	$16.00	2,038.82	9.41	$0.005
Water Heater - Low-Flow Showerheads	45%	85%	10	$12.00	9,288.83	64.89	$0.001
Water Heater - Pipe Insulation	18%	38%	15	$512.22	3,022.81	0.87	$0.055
Water Heater - Tank Blanket/Insulation	17%	75%	5	$79.44	1,243.76	0.55	$0.035
Water Heater - Thermostat Setback	17%	75%	2	$5.00	1,969.32	2.43	$0.003
Water Heater - Timer	17%	40%	5	$115.00	1,903.66	0.58	$0.033
Water Heater - Desuperheater	0%	75%	15	$1,500.00	12,691.07	1.24	$0.045
Water Heater - Solar System	0%	75%	20	$5,400.00	52,127.88	1.32	$0.050
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	21%	45%	8	$130.00	1,453.61	0.34	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	7%	45%	5	$115.00	1,017.52	0.16	$0.082
Refrigerator - Early Replacement	37%	100%	9	$130.00	3,683.75	0.87	$0.029
Refrigerator - Maintenance	37%	100%	4	$50.00	886.07	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	9,535.23	2.08	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	6,521.31	1.74	$0.017
Freezer - Early Replacement	37%	100%	6	$130.00	3,651.93	0.62	$0.031
Freezer - Maintenance	37%	100%	4	$50.00	326.07	0.08	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	4,638.79	0.83	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	8,120.04	0.42	$0.075
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$582.88	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	-	1.67	$0.034
Pool/Spa cover	25%	90%	5	$115.00	9,744.05	3.59	$0.006

Table B-20 Energy Efficiency Non-Equipment Data, Single Family Electric Customer Only, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	20%	48%	20	$415.05	1,279.22	0.89	$0.065
Insulation - Ducting	50%	75%	20	$95.00	7,096.75	20.40	$0.010
Insulation - Foundation	20%	90%	20	$760.32	17,328.51	5.59	$0.023
Insulation - Infiltration Control	46%	90%	15	$427.68	2,782.18	1.13	$0.050
Insulation - Radiant Barrier	25%	90%	20	$94.61	457.31	1.36	$0.055
Insulation - Wall Cavity	20%	90%	20	$6,946.32	2,459.17	0.09	$0.092
Insulation - Wall Sheathing	20%	90%	20	$5,093.97	7,414.76	0.37	$0.079
Ducting - Repair and Sealing	50%	50%	18	$497.62	108,278.65	32.30	$0.004
Windows - High Efficiency/ENERGY STAR	85%	90%	20	$9,108.09	11,140.54	0.46	$0.087
Windows - Install Reflective Film	2%	45%	10	$1,313.59	7,689.25	0.99	$0.083
Doors - Storm and Thermal	13%	75%	25	$133.00	302.08	0.79	$0.067
Roofs - High Reflectivity	5%	90%	20	$97.66	818.78	4.18	$0.055
Attic Fan - Installation	4%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	4%	11%	20	$461.52	57.40	0.06	$0.096
Whole-House Fan - Installation	4%	19%	20	$712.80	-	-	$-
Ceiling Fan - Installation	57%	75%	10	$204.00	2,731.27	2.26	$0.052
Thermostat - Clock/Programmable	57%	75%	5	$30.00	4,542.80	4.93	$0.004
Home Energy Management System	20%	68%	15	$1,747.00	4,922.10	0.43	$0.080
Central AC - Early Replacement	24%	100%	15	$3,373.96	5,658.94	0.54	$0.097
Central AC - Maintenance and Tune-Up	24%	100%	2	$175.00	1,571.93	0.08	$0.106
Central Heat Pump - Maintenance	1%	90%	2	$175.00	8,856.33	0.34	$0.020
Room AC - Removal of Second Unit	0%	38%	4	$60.00	11,966.74	6.50	$0.005
Boiler - Hot Water Reset	17%	95%	11	$37.00	-	20.13	$0.003
Boiler - Pipe Insulation	7%	41%	9	$891.26	-	0.21	$0.101
Boiler - Maintenance	20%	100%	10	$215.00	2,410.35	0.83	$0.057
Furnace - Maintenance	20%	100%	15	$215.00	-	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	8,501.83	4.46	$0.018
Water Heater - Faucet Aerators	16%	90%	9	$16.00	1,772.74	8.17	$0.005
Water Heater - Low-Flow Showerheads	28%	95%	10	$12.00	8,076.60	56.49	$0.001
Water Heater - Pipe Insulation	9%	41%	15	$512.22	2,630.74	0.76	$0.059
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	1,084.92	0.47	$0.040
Water Heater - Thermostat Setback	5%	75%	2	$5.00	1,969.32	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	1,655.03	0.50	$0.038
Water Heater - Desuperheater	0%	75%	15	$1,500.00	11,033.52	1.09	$0.049
Water Heater - Solar System	0%	75%	20	$5,400.00	45,319.61	1.17	$0.053
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	40%	45%	8	$130.00	1,407.83	0.32	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	25%	45%	5	$115.00	985.48	0.15	$0.082
Refrigerator - Early Replacement	24%	100%	9	$130.00	2,376.61	0.71	$0.041
Refrigerator - Maintenance	24%	100%	4	$50.00	571.65	0.15	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	6,151.75	1.69	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	5,289.38	1.62	$0.020
Freezer - Early Replacement	24%	100%	6	$130.00	2,962.05	0.56	$0.037
Freezer - Maintenance	24%	100%	4	$50.00	264.47	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	3,386.02	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	8,121.72	0.44	$0.075
ENERGY STAR Home Design	14%	75%	25	$8,544.00	21,977.04	0.89	$0.067
Information Based Energy Efficiency Programs	0%	0%	20	$760.32	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	-	1.96	$0.036
Pool/Spa cover	25%	90%	5	$115.00	9,746.06	3.73	$0.006

Table B-21 Energy Efficiency Non-Equipment Data, Multi Family Electric Customer Only, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	13%	19%	20	$574.27	2,430.21	1.74	$0.048
Insulation - Ducting	13%	75%	20	$95.00	467.68	5.09	$0.047
Insulation - Foundation	13%	30%	20	$270.24	-	-	$-
Insulation - Infiltration Control	19%	90%	15	$152.01	4,895.20	7.44	$0.011
Insulation - Radiant Barrier	5%	90%	20	$130.90	2,286.80	7.22	$0.018
Insulation - Wall Cavity	13%	15%	20	$696.64	2,947.66	1.53	$0.047
Insulation - Wall Sheathing	13%	80%	20	$510.87	4,551.29	3.75	$0.028
Ducting - Repair and Sealing	8%	50%	18	$497.62	907.99	1.61	$0.072
Windows - High Efficiency/ENERGY STAR	68%	90%	20	$1,669.20	1,975.83	1.01	$0.076
Windows - Install Reflective Film	5%	45%	10	$240.74	1,666.81	2.19	$0.045
Doors - Storm and Thermal	17%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	3%	10%	20	$135.12	524.03	3.55	$0.052
Attic Fan - Installation	1%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	2%	11%	20	$461.52	9.73	0.02	$0.096
Whole-House Fan - Installation	4%	19%	20	$253.35	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	1,692.50	2.62	$0.040
Thermostat - Clock/Programmable	27%	68%	5	$30.00	2,065.36	3.54	$0.005
Home Energy Management System	5%	13%	15	$1,747.00	11,203.87	1.45	$0.044
Central AC - Early Replacement	27%	100%	15	$3,373.96	1,621.14	0.28	$0.102
Central AC - Maintenance and Tune-Up	27%	100%	2	$175.00	450.32	0.05	$0.149
Central Heat Pump - Maintenance	0%	90%	2	$175.00	3,556.11	0.28	$0.024
Room AC - Removal of Second Unit	0%	38%	4	$60.00	3,766.64	4.07	$0.007
Boiler - Hot Water Reset	8%	68%	11	$37.00	-	12.05	$0.004
Boiler - Pipe Insulation	9%	38%	9	$891.26	-	0.13	$0.111
Boiler - Maintenance	22%	100%	10	$215.00	968.50	0.64	$0.064
Furnace - Maintenance	22%	100%	15	$215.00	-	0.25	$0.088
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	8,501.83	3.84	$0.020
Water Heater - Faucet Aerators	12%	90%	9	$16.00	1,819.19	11.32	$0.004
Water Heater - Low-Flow Showerheads	27%	75%	10	$12.00	8,299.20	78.87	$0.001
Water Heater - Pipe Insulation	9%	38%	15	$512.22	1,927.06	0.75	$0.058
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	793.22	0.47	$0.039
Water Heater - Thermostat Setback	17%	75%	2	$5.00	1,969.32	2.42	$0.003
Water Heater - Timer	5%	40%	5	$115.00	1,214.15	0.50	$0.037
Water Heater - Desuperheater	0%	75%	15	$1,500.00	8,094.36	1.08	$0.048
Water Heater - Solar System	0%	75%	20	$5,400.00	33,247.15	1.27	$0.051
Interior Lighting - Occupancy Sensors	5%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	18%	45%	8	$130.00	613.02	0.16	$0.092
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	8%	45%	5	$115.00	429.11	0.07	$0.130
Refrigerator - Early Replacement	27%	100%	9	$130.00	3,682.40	0.86	$0.029
Refrigerator - Maintenance	27%	100%	4	$50.00	885.74	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	9,531.76	1.95	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	6,518.35	1.80	$0.017
Freezer - Early Replacement	27%	100%	6	$130.00	3,650.28	0.65	$0.031
Freezer - Maintenance	27%	100%	4	$50.00	325.92	0.09	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	4,638.79	0.84	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	8,120.04	0.28	$0.081
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$270.24	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	-	1.28	$0.041
Pool/Spa cover	25%	90%	5	$115.00	9,744.05	2.31	$0.009

Table B-22 Energy Efficiency Non-Equipment Data, Multi Family Electric Customer Only, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	4%	48%	20	$534.21	1,124.17	1.13	$0.060
Insulation - Ducting	50%	75%	20	$95.00	263.63	3.13	$0.060
Insulation - Foundation	4%	90%	20	$251.39	5,766.57	10.33	$0.014
Insulation - Infiltration Control	19%	90%	15	$141.40	1,946.84	4.29	$0.019
Insulation - Radiant Barrier	5%	90%	20	$121.77	386.50	1.71	$0.050
Insulation - Wall Cavity	4%	90%	20	$624.58	1,176.56	0.88	$0.061
Insulation - Wall Sheathing	4%	90%	20	$458.02	3,430.78	3.66	$0.030
Ducting - Repair and Sealing	50%	50%	18	$497.62	513.24	0.99	$0.083
Windows - High Efficiency/ENERGY STAR	78%	90%	20	$2,270.12	2,063.71	1.02	$0.078
Windows - Install Reflective Film	2%	45%	10	$327.40	1,834.77	2.14	$0.052
Doors - Storm and Thermal	19%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	0%	90%	20	$125.70	232.26	2.08	$0.069
Attic Fan - Installation	15%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	5%	11%	20	$461.52	16.09	0.04	$0.096
Whole-House Fan - Installation	4%	19%	20	$235.67	-	-	$-
Ceiling Fan - Installation	33%	75%	10	$204.00	1,274.63	2.39	$0.049
Thermostat - Clock/Programmable	19%	25%	5	$30.00	1,548.87	2.93	$0.007
Home Energy Management System	5%	68%	15	$1,747.00	8,728.25	1.27	$0.050
Central AC - Early Replacement	9%	100%	15	$3,373.96	1,214.05	0.26	$0.105
Central AC - Maintenance and Tune-Up	9%	100%	2	$175.00	337.24	0.04	$0.190
Central Heat Pump - Maintenance	0%	90%	2	$175.00	1,531.17	0.12	$0.053
Room AC - Removal of Second Unit	0%	38%	4	$60.00	3,224.62	3.67	$0.008
Boiler - Hot Water Reset	15%	85%	11	$37.00	-	-	$-
Boiler - Pipe Insulation	20%	41%	9	$891.26	-	-	$-
Boiler - Maintenance	14%	100%	10	$215.00	431.51	0.29	$0.094
Furnace - Maintenance	14%	100%	15	$215.00	-	0.19	$0.094
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	8,501.83	3.62	$0.022
Water Heater - Faucet Aerators	0%	90%	9	$16.00	1,583.80	10.09	$0.004
Water Heater - Low-Flow Showerheads	26%	75%	10	$12.00	7,225.16	70.54	$0.001
Water Heater - Pipe Insulation	13%	41%	15	$512.22	1,677.39	0.68	$0.062
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	690.63	0.42	$0.044
Water Heater - Thermostat Setback	5%	75%	2	$5.00	1,969.32	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	1,056.96	0.44	$0.042
Water Heater - Desuperheater	0%	75%	15	$1,500.00	7,046.42	0.97	$0.052
Water Heater - Solar System	0%	75%	20	$5,400.00	28,942.78	1.14	$0.054
Interior Lighting - Occupancy Sensors	13%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	31%	45%	8	$130.00	627.99	0.15	$0.094
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	22%	45%	5	$115.00	439.59	0.07	$0.133
Refrigerator - Early Replacement	9%	100%	9	$130.00	2,375.78	0.73	$0.041
Refrigerator - Maintenance	9%	100%	4	$50.00	571.46	0.16	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	6,149.60	1.74	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	5,288.41	1.64	$0.020
Freezer - Early Replacement	9%	100%	6	$130.00	2,961.51	0.57	$0.037
Freezer - Maintenance	9%	100%	4	$50.00	264.42	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	3,386.02	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	8,121.72	0.31	$0.081
ENERGY STAR Home Design	14%	75%	25	$8,544.00	8,212.79	0.55	$0.073
Information Based Energy Efficiency Programs	0%	0%	20	$251.39	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	-	0.45	$0.076
Pool/Spa cover	25%	90%	5	$115.00	9,746.06	2.47	$0.009

Table B-23 Energy Efficiency Non-Equipment Data, Single Family Electric/Gas Customer, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	33%	38%	20	$363.42	2,912.27	1.29	$0.055
Insulation - Ducting	15%	75%	20	$95.00	3,741.49	11.81	$0.020
Insulation - Foundation	33%	50%	20	$582.88	-	-	$-
Insulation - Infiltration Control	46%	90%	15	$327.87	7,442.70	2.15	$0.032
Insulation - Radiant Barrier	5%	90%	20	$82.84	2,731.28	5.30	$0.023
Insulation - Wall Cavity	33%	50%	20	$6,048.96	6,184.68	0.15	$0.088
Insulation - Wall Sheathing	33%	80%	20	$4,435.90	13,933.45	0.48	$0.074
Ducting - Repair and Sealing	16%	50%	18	$497.62	22,902.15	10.78	$0.018
Windows - High Efficiency/ENERGY STAR	47%	90%	20	$7,134.01	8,313.25	0.48	$0.087
Windows - Install Reflective Film	5%	45%	10	$1,028.88	7,985.62	1.18	$0.070
Doors - Storm and Thermal	38%	75%	25	$133.00	1,711.93	2.99	$0.041
Roofs - High Reflectivity	5%	10%	20	$85.51	1,071.04	5.51	$0.044
Attic Fan - Installation	12%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	13%	45%	20	$461.52	32.83	0.03	$0.096
Whole-House Fan - Installation	4%	19%	20	$546.45	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	3,176.19	2.36	$0.045
Thermostat - Clock/Programmable	51%	56%	5	$30.00	8,643.56	5.81	$0.003
Home Energy Management System	20%	38%	15	$1,747.00	9,214.32	0.56	$0.071
Central AC - Early Replacement	37%	100%	15	$3,373.96	5,209.84	0.44	$0.097
Central AC - Maintenance and Tune-Up	37%	100%	2	$175.00	1,447.18	0.07	$0.109
Central Heat Pump - Maintenance	3%	90%	2	$175.00	9,833.66	0.34	$0.018
Room AC - Removal of Second Unit	0%	38%	4	$60.00	11,319.62	6.14	$0.005
Boiler - Hot Water Reset	14%	56%	11	$37.00	11,071.35	15.16	$0.003
Boiler - Pipe Insulation	16%	38%	9	$891.26	3,537.69	0.16	$0.101
Boiler - Maintenance	32%	100%	10	$215.00	2,669.08	0.74	$0.053
Furnace - Maintenance	32%	100%	15	$215.00	736.95	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	48,007.46	4.98	$0.016
Water Heater - Faucet Aerators	25%	90%	9	$16.00	3,329.85	9.41	$0.005
Water Heater - Low-Flow Showerheads	45%	85%	10	$12.00	15,055.45	64.89	$0.001
Water Heater - Pipe Insulation	18%	38%	15	$512.22	4,916.32	0.87	$0.055
Water Heater - Tank Blanket/Insulation	17%	75%	5	$79.44	2,018.38	0.55	$0.035
Water Heater - Thermostat Setback	17%	75%	2	$5.00	1,969.32	2.43	$0.003
Water Heater - Timer	17%	40%	5	$115.00	3,088.83	0.58	$0.033
Water Heater - Desuperheater	0%	75%	15	$1,500.00	20,592.19	1.24	$0.045
Water Heater - Solar System	0%	75%	20	$5,400.00	52,127.88	1.32	$0.050
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	21%	45%	8	$130.00	1,453.61	0.34	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	7%	45%	5	$115.00	1,017.52	0.16	$0.082
Refrigerator - Early Replacement	37%	100%	9	$130.00	3,683.75	0.87	$0.029
Refrigerator - Maintenance	37%	100%	4	$50.00	886.07	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	9,535.23	2.08	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	6,521.31	1.74	$0.017
Freezer - Early Replacement	37%	100%	6	$130.00	3,651.93	0.62	$0.031
Freezer - Maintenance	37%	100%	4	$50.00	326.07	0.08	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	4,638.79	0.83	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	15,820.04	0.42	$0.075
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$582.88	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	30,594.95	1.67	$0.034
Pool/Spa cover	25%	90%	5	$115.00	18,984.05	3.59	$0.006

Table B-24 Energy Efficiency Non-Equipment Data, Single Family Electric/Gas Customer, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	20%	48%	20	$415.05	2,137.20	0.89	$0.065
Insulation - Ducting	50%	75%	20	$95.00	8,343.12	20.40	$0.010
Insulation - Foundation	20%	90%	20	$760.32	25,270.59	5.59	$0.023
Insulation - Infiltration Control	46%	90%	15	$427.68	4,767.75	1.13	$0.050
Insulation - Radiant Barrier	25%	90%	20	$94.61	748.40	1.36	$0.055
Insulation - Wall Cavity	20%	90%	20	$6,946.32	3,921.18	0.09	$0.092
Insulation - Wall Sheathing	20%	90%	20	$5,093.97	11,570.89	0.37	$0.079
Ducting - Repair and Sealing	50%	50%	18	$497.62	113,116.16	32.30	$0.004
Windows - High Efficiency/ENERGY STAR	85%	90%	20	$9,108.09	10,879.73	0.46	$0.087
Windows - Install Reflective Film	2%	45%	10	$1,313.59	7,265.98	0.99	$0.083
Doors - Storm and Thermal	13%	75%	25	$133.00	463.77	0.79	$0.067
Roofs - High Reflectivity	5%	90%	20	$97.66	773.71	4.18	$0.055
Attic Fan - Installation	4%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	4%	11%	20	$461.52	54.25	0.06	$0.096
Whole-House Fan - Installation	4%	19%	20	$712.80	-	-	$-
Ceiling Fan - Installation	57%	75%	10	$204.00	2,580.92	2.26	$0.052
Thermostat - Clock/Programmable	57%	75%	5	$30.00	7,145.58	4.93	$0.004
Home Energy Management System	20%	68%	15	$1,747.00	6,705.23	0.43	$0.080
Central AC - Early Replacement	24%	100%	15	$3,373.96	5,347.44	0.54	$0.097
Central AC - Maintenance and Tune-Up	24%	100%	2	$175.00	1,485.40	0.08	$0.106
Central Heat Pump - Maintenance	1%	90%	2	$175.00	8,666.71	0.34	$0.020
Room AC - Removal of Second Unit	0%	38%	4	$60.00	11,308.02	6.50	$0.005
Boiler - Hot Water Reset	17%	95%	11	$37.00	10,897.18	20.13	$0.003
Boiler - Pipe Insulation	7%	41%	9	$891.26	3,482.03	0.21	$0.101
Boiler - Maintenance	20%	100%	10	$215.00	2,358.75	0.83	$0.057
Furnace - Maintenance	20%	100%	15	$215.00	731.41	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	41,065.39	4.46	$0.018
Water Heater - Faucet Aerators	16%	90%	9	$16.00	2,836.91	8.17	$0.005
Water Heater - Low-Flow Showerheads	28%	95%	10	$12.00	12,829.88	56.49	$0.001
Water Heater - Pipe Insulation	9%	41%	15	$512.22	4,191.52	0.76	$0.059
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	1,723.42	0.47	$0.040
Water Heater - Thermostat Setback	5%	75%	2	$5.00	1,969.32	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	2,631.94	0.50	$0.038
Water Heater - Desuperheater	0%	75%	15	$1,500.00	17,546.24	1.09	$0.049
Water Heater - Solar System	0%	75%	20	$5,400.00	45,319.61	1.17	$0.053
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	40%	45%	8	$130.00	1,455.59	0.32	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	25%	45%	5	$115.00	1,018.92	0.15	$0.082
Refrigerator - Early Replacement	24%	100%	9	$130.00	2,376.61	0.71	$0.041
Refrigerator - Maintenance	24%	100%	4	$50.00	571.65	0.15	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	6,151.75	1.69	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	5,289.38	1.62	$0.020
Freezer - Early Replacement	24%	100%	6	$130.00	2,962.05	0.56	$0.037
Freezer - Maintenance	24%	100%	4	$50.00	264.47	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	3,386.02	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	15,821.72	0.44	$0.075
ENERGY STAR Home Design	14%	75%	25	$8,544.00	30,123.55	0.89	$0.067
Information Based Energy Efficiency Programs	0%	0%	20	$760.32	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	28,407.08	1.96	$0.036
Pool/Spa cover	25%	90%	5	$115.00	18,986.06	3.73	$0.006

Table B-25 Energy Efficiency Non-Equipment Data, Multi Family Electric/Gas Customer, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	13%	19%	20	$574.27	6,135.46	1.74	$0.048
Insulation - Ducting	13%	75%	20	$95.00	1,051.62	5.09	$0.047
Insulation - Foundation	13%	30%	20	$270.24	-	-	$-
Insulation - Infiltration Control	19%	90%	15	$152.01	12,215.37	7.44	$0.011
Insulation - Radiant Barrier	5%	90%	20	$130.90	5,768.97	7.22	$0.018
Insulation - Wall Cavity	13%	15%	20	$696.64	7,474.70	1.53	$0.047
Insulation - Wall Sheathing	13%	80%	20	$510.87	13,036.57	3.75	$0.028
Ducting - Repair and Sealing	8%	50%	18	$497.62	2,042.31	1.61	$0.072
Windows - High Efficiency/ENERGY STAR	68%	90%	20	$1,669.20	4,858.78	1.01	$0.076
Windows - Install Reflective Film	5%	45%	10	$240.74	3,750.32	2.19	$0.045
Doors - Storm and Thermal	17%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	3%	10%	20	$135.12	1,179.06	3.55	$0.052
Attic Fan - Installation	1%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	2%	11%	20	$461.52	21.89	0.02	$0.096
Whole-House Fan - Installation	4%	19%	20	$253.35	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	3,808.12	2.62	$0.040
Thermostat - Clock/Programmable	27%	68%	5	$30.00	5,359.54	3.54	$0.005
Home Energy Management System	5%	13%	15	$1,747.00	24,561.26	1.45	$0.044
Central AC - Early Replacement	27%	100%	15	$3,373.96	3,647.57	0.28	$0.102
Central AC - Maintenance and Tune-Up	27%	100%	2	$175.00	1,013.21	0.05	$0.149
Central Heat Pump - Maintenance	0%	90%	2	$175.00	7,272.76	0.28	$0.024
Room AC - Removal of Second Unit	0%	38%	4	$60.00	8,474.95	4.07	$0.007
Boiler - Hot Water Reset	8%	68%	11	$37.00	8,635.28	12.05	$0.004
Boiler - Pipe Insulation	9%	38%	9	$891.26	2,737.29	0.13	$0.111
Boiler - Maintenance	22%	100%	10	$215.00	1,980.73	0.64	$0.064
Furnace - Maintenance	22%	100%	15	$215.00	562.72	0.25	$0.088
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	37,392.62	3.84	$0.020
Water Heater - Faucet Aerators	12%	90%	9	$16.00	4,082.49	11.32	$0.004
Water Heater - Low-Flow Showerheads	27%	75%	10	$12.00	18,620.90	78.87	$0.001
Water Heater - Pipe Insulation	9%	38%	15	$512.22	4,320.97	0.75	$0.058
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	1,778.72	0.47	$0.039
Water Heater - Thermostat Setback	17%	75%	2	$5.00	1,969.32	2.42	$0.003
Water Heater - Timer	5%	40%	5	$115.00	2,723.67	0.50	$0.037
Water Heater - Desuperheater	0%	75%	15	$1,500.00	18,157.77	1.08	$0.048
Water Heater - Solar System	0%	75%	20	$5,400.00	50,848.58	1.27	$0.051
Interior Lighting - Occupancy Sensors	5%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	18%	45%	8	$130.00	709.81	0.16	$0.092
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	8%	45%	5	$115.00	496.87	0.07	$0.130
Refrigerator - Early Replacement	27%	100%	9	$130.00	3,682.40	0.86	$0.029
Refrigerator - Maintenance	27%	100%	4	$50.00	885.74	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	9,531.76	1.95	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	6,518.35	1.80	$0.017
Freezer - Early Replacement	27%	100%	6	$130.00	3,650.28	0.65	$0.031
Freezer - Maintenance	27%	100%	4	$50.00	325.92	0.09	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	4,638.79	0.84	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	10,815.04	0.28	$0.081
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$270.24	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	23,344.02	1.28	$0.041
Pool/Spa cover	25%	90%	5	$115.00	12,978.05	2.31	$0.009

Table B-26 Energy Efficiency Non-Equipment Data, Multi Family Electric/Gas Customer, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	4%	48%	20	$534.21	3,424.65	1.13	$0.060
Insulation - Ducting	50%	75%	20	$95.00	593.18	3.13	$0.060
Insulation - Foundation	4%	90%	20	$251.39	15,510.99	10.33	$0.014
Insulation - Infiltration Control	19%	90%	15	$141.40	6,057.59	4.29	$0.019
Insulation - Radiant Barrier	5%	90%	20	$121.77	1,186.25	1.71	$0.050
Insulation - Wall Cavity	4%	90%	20	$624.58	3,739.70	0.88	$0.061
Insulation - Wall Sheathing	4%	90%	20	$458.02	10,779.51	3.66	$0.030
Ducting - Repair and Sealing	50%	50%	18	$497.62	1,154.80	0.99	$0.083
Windows - High Efficiency/ENERGY STAR	78%	90%	20	$2,270.12	5,801.41	1.02	$0.078
Windows - Install Reflective Film	2%	45%	10	$327.40	4,128.24	2.14	$0.052
Doors - Storm and Thermal	19%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	0%	90%	20	$125.70	522.59	2.08	$0.069
Attic Fan - Installation	15%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	5%	11%	20	$461.52	36.20	0.04	$0.096
Whole-House Fan - Installation	4%	19%	20	$235.67	-	-	$-
Ceiling Fan - Installation	33%	75%	10	$204.00	2,867.91	2.39	$0.049
Thermostat - Clock/Programmable	19%	25%	5	$30.00	4,326.55	2.93	$0.007
Home Energy Management System	5%	68%	15	$1,747.00	19,831.93	1.27	$0.050
Central AC - Early Replacement	9%	100%	15	$3,373.96	2,731.61	0.26	$0.105
Central AC - Maintenance and Tune-Up	9%	100%	2	$175.00	758.78	0.04	$0.190
Central Heat Pump - Maintenance	0%	90%	2	$175.00	3,132.87	0.12	$0.053
Room AC - Removal of Second Unit	0%	38%	4	$60.00	7,255.40	3.67	$0.008
Boiler - Hot Water Reset	15%	85%	11	$37.00	-	-	$-
Boiler - Pipe Insulation	20%	41%	9	$891.26	-	-	$-
Boiler - Maintenance	14%	100%	10	$215.00	882.89	0.29	$0.094
Furnace - Maintenance	14%	100%	15	$215.00	407.05	0.19	$0.094
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	33,477.72	3.62	$0.022
Water Heater - Faucet Aerators	0%	90%	9	$16.00	3,543.56	10.09	$0.004
Water Heater - Low-Flow Showerheads	26%	75%	10	$12.00	16,168.18	70.54	$0.001
Water Heater - Pipe Insulation	13%	41%	15	$512.22	3,752.55	0.68	$0.062
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	1,544.41	0.42	$0.044
Water Heater - Thermostat Setback	5%	75%	2	$5.00	1,969.32	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	2,365.81	0.44	$0.042
Water Heater - Desuperheater	0%	75%	15	$1,500.00	15,772.05	0.97	$0.052
Water Heater - Solar System	0%	75%	20	$5,400.00	44,265.42	1.14	$0.054
Interior Lighting - Occupancy Sensors	13%	28%	15	$750.00	1,128.26	0.08	$0.098
Exterior Lighting - Photosensor Control	31%	45%	8	$130.00	677.78	0.15	$0.094
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	22%	45%	5	$115.00	474.45	0.07	$0.133
Refrigerator - Early Replacement	9%	100%	9	$130.00	2,375.78	0.73	$0.041
Refrigerator - Maintenance	9%	100%	4	$50.00	571.46	0.16	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	6,149.60	1.74	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	5,288.41	1.64	$0.020
Freezer - Early Replacement	9%	100%	6	$130.00	2,961.51	0.57	$0.037
Freezer - Maintenance	9%	100%	4	$50.00	264.42	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	1,173.84	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	3,386.02	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	10,816.72	0.31	$0.081
ENERGY STAR Home Design	14%	75%	25	$8,544.00	18,960.36	0.55	$0.073
Information Based Energy Efficiency Programs	0%	0%	20	$251.39	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	6,743.49	0.45	$0.076
Pool/Spa cover	25%	90%	5	$115.00	12,980.06	2.47	$0.009

Table B-27 Energy Efficiency Non-Equipment Data, Single Family Gas Only Customer, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	33%	38%	20	$363.42	932.93	1.29	$0.055
Insulation - Ducting	15%	75%	20	$95.00	1,224.47	11.81	$0.020
Insulation - Foundation	33%	50%	20	$582.88	-	-	$-
Insulation - Infiltration Control	46%	90%	15	$327.87	2,604.43	2.15	$0.032
Insulation - Radiant Barrier	5%	90%	20	$82.84	874.62	5.30	$0.023
Insulation - Wall Cavity	33%	50%	20	$6,048.96	2,157.40	0.15	$0.088
Insulation - Wall Sheathing	33%	80%	20	$4,435.90	5,008.65	0.48	$0.074
Ducting - Repair and Sealing	16%	50%	18	$497.62	5,927.99	10.78	$0.018
Windows - High Efficiency/ENERGY STAR	47%	90%	20	$7,134.01	214.38	0.48	$0.087
Windows - Install Reflective Film	5%	45%	10	$1,028.88	-	1.18	$0.070
Doors - Storm and Thermal	38%	75%	25	$133.00	563.64	2.99	$0.041
Roofs - High Reflectivity	5%	10%	20	$85.51	-	5.51	$0.044
Attic Fan - Installation	12%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	13%	45%	20	$461.52	-	0.03	$0.096
Whole-House Fan - Installation	4%	19%	20	$546.45	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	-	2.36	$0.045
Thermostat - Clock/Programmable	51%	56%	5	$30.00	3,107.78	5.81	$0.003
Home Energy Management System	20%	38%	15	$1,747.00	2,501.93	0.56	$0.071
Central AC - Early Replacement	37%	100%	15	$3,373.96	-	0.44	$0.097
Central AC - Maintenance and Tune-Up	37%	100%	2	$175.00	-	0.07	$0.109
Central Heat Pump - Maintenance	3%	90%	2	$175.00	-	0.34	$0.018
Room AC - Removal of Second Unit	0%	38%	4	$60.00	-	6.14	$0.005
Boiler - Hot Water Reset	14%	56%	11	$37.00	10,219.71	15.16	$0.003
Boiler - Pipe Insulation	16%	38%	9	$891.26	3,265.56	0.16	$0.101
Boiler - Maintenance	32%	100%	10	$215.00	-	0.74	$0.053
Furnace - Maintenance	32%	100%	15	$215.00	680.26	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	36,466.73	4.98	$0.016
Water Heater - Faucet Aerators	25%	90%	9	$16.00	1,191.72	9.41	$0.005
Water Heater - Low-Flow Showerheads	45%	85%	10	$12.00	5,323.03	64.89	$0.001
Water Heater - Pipe Insulation	18%	38%	15	$512.22	1,747.86	0.87	$0.055
Water Heater - Tank Blanket/Insulation	17%	75%	5	$79.44	715.03	0.55	$0.035
Water Heater - Thermostat Setback	17%	75%	2	$5.00	-	2.43	$0.003
Water Heater - Timer	17%	40%	5	$115.00	1,094.00	0.58	$0.033
Water Heater - Desuperheater	0%	75%	15	$1,500.00	7,293.35	1.24	$0.045
Water Heater - Solar System	0%	75%	20	$5,400.00	-	1.32	$0.050
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	-	0.08	$0.098
Exterior Lighting - Photosensor Control	21%	45%	8	$130.00	-	0.34	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	7%	45%	5	$115.00	-	0.16	$0.082
Refrigerator - Early Replacement	37%	100%	9	$130.00	-	0.87	$0.029
Refrigerator - Maintenance	37%	100%	4	$50.00	-	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	-	2.08	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	-	1.74	$0.017
Freezer - Early Replacement	37%	100%	6	$130.00	-	0.62	$0.031
Freezer - Maintenance	37%	100%	4	$50.00	-	0.08	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	-	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	-	0.83	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	7,700.00	0.42	$0.075
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$582.88	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	28,241.49	1.67	$0.034
Pool/Spa cover	25%	90%	5	$115.00	9,240.00	3.59	$0.006

Table B-28 Energy Efficiency Non-Equipment Data, Single Family Gas Only Customer, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	20%	48%	20	$415.05	1,022.36	0.89	$0.065
Insulation - Ducting	50%	75%	20	$95.00	1,311.71	20.40	$0.010
Insulation - Foundation	20%	90%	20	$760.32	9,548.49	5.59	$0.023
Insulation - Infiltration Control	46%	90%	15	$427.68	2,353.37	1.13	$0.050
Insulation - Radiant Barrier	25%	90%	20	$94.61	347.22	1.36	$0.055
Insulation - Wall Cavity	20%	90%	20	$6,946.32	1,736.09	0.09	$0.092
Insulation - Wall Sheathing	20%	90%	20	$5,093.97	4,957.50	0.37	$0.079
Ducting - Repair and Sealing	50%	50%	18	$497.62	5,999.15	32.30	$0.004
Windows - High Efficiency/ENERGY STAR	85%	90%	20	$9,108.09	212.19	0.46	$0.087
Windows - Install Reflective Film	2%	45%	10	$1,313.59	-	0.99	$0.083
Doors - Storm and Thermal	13%	75%	25	$133.00	192.90	0.79	$0.067
Roofs - High Reflectivity	5%	90%	20	$97.66	-	4.18	$0.055
Attic Fan - Installation	4%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	4%	11%	20	$461.52	-	0.06	$0.096
Whole-House Fan - Installation	4%	19%	20	$712.80	-	-	$-
Ceiling Fan - Installation	57%	75%	10	$204.00	-	2.26	$0.052
Thermostat - Clock/Programmable	57%	75%	5	$30.00	3,076.04	4.93	$0.004
Home Energy Management System	20%	68%	15	$1,747.00	2,166.82	0.43	$0.080
Central AC - Early Replacement	24%	100%	15	$3,373.96	-	0.54	$0.097
Central AC - Maintenance and Tune-Up	24%	100%	2	$175.00	-	0.08	$0.106
Central Heat Pump - Maintenance	1%	90%	2	$175.00	-	0.34	$0.020
Room AC - Removal of Second Unit	0%	38%	4	$60.00	-	6.50	$0.005
Boiler - Hot Water Reset	17%	95%	11	$37.00	10,058.93	20.13	$0.003
Boiler - Pipe Insulation	7%	41%	9	$891.26	3,214.18	0.21	$0.101
Boiler - Maintenance	20%	100%	10	$215.00	-	0.83	$0.057
Furnace - Maintenance	20%	100%	15	$215.00	675.15	0.33	$0.082
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	30,058.67	4.46	$0.018
Water Heater - Faucet Aerators	16%	90%	9	$16.00	982.31	8.17	$0.005
Water Heater - Low-Flow Showerheads	28%	95%	10	$12.00	4,387.65	56.49	$0.001
Water Heater - Pipe Insulation	9%	41%	15	$512.22	1,440.72	0.76	$0.059
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	589.39	0.47	$0.040
Water Heater - Thermostat Setback	5%	75%	2	$5.00	-	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	901.76	0.50	$0.038
Water Heater - Desuperheater	0%	75%	15	$1,500.00	6,011.73	1.09	$0.049
Water Heater - Solar System	0%	75%	20	$5,400.00	-	1.17	$0.053
Interior Lighting - Occupancy Sensors	18%	28%	15	$750.00	-	0.08	$0.098
Exterior Lighting - Photosensor Control	40%	45%	8	$130.00	-	0.32	$0.060
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	25%	45%	5	$115.00	-	0.15	$0.082
Refrigerator - Early Replacement	24%	100%	9	$130.00	-	0.71	$0.041
Refrigerator - Maintenance	24%	100%	4	$50.00	-	0.15	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	-	1.69	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	-	1.62	$0.020
Freezer - Early Replacement	24%	100%	6	$130.00	-	0.56	$0.037
Freezer - Maintenance	24%	100%	4	$50.00	-	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	-	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	-	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	7,700.00	0.44	$0.075
ENERGY STAR Home Design	14%	75%	25	$8,544.00	9,922.71	0.89	$0.067
Information Based Energy Efficiency Programs	0%	0%	20	$760.32	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	26,221.92	1.96	$0.036
Pool/Spa cover	25%	90%	5	$115.00	9,240.00	3.73	$0.006

Table B-29 Energy Efficiency Non-Equipment Data, Multi Family Gas Only Customer, Existing Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	13%	19%	20	$574.27	2,101.34	1.74	$0.048
Insulation - Ducting	13%	75%	20	$95.00	-	5.09	$0.047
Insulation - Foundation	13%	30%	20	$270.24	-	-	$-
Insulation - Infiltration Control	19%	90%	15	$152.01	4,138.79	7.44	$0.011
Insulation - Radiant Barrier	5%	90%	20	$130.90	1,966.40	7.22	$0.018
Insulation - Wall Cavity	13%	15%	20	$696.64	2,711.83	1.53	$0.047
Insulation - Wall Sheathing	13%	80%	20	$510.87	6,787.57	3.75	$0.028
Ducting - Repair and Sealing	8%	50%	18	$497.62	-	1.61	$0.072
Windows - High Efficiency/ENERGY STAR	68%	90%	20	$1,669.20	858.90	1.01	$0.076
Windows - Install Reflective Film	5%	45%	10	$240.74	-	2.19	$0.045
Doors - Storm and Thermal	17%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	3%	10%	20	$135.12	-	3.55	$0.052
Attic Fan - Installation	1%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	2%	11%	20	$461.52	-	0.02	$0.096
Whole-House Fan - Installation	4%	19%	20	$253.35	-	-	$-
Ceiling Fan - Installation	56%	75%	10	$204.00	-	2.62	$0.040
Thermostat - Clock/Programmable	27%	68%	5	$30.00	2,165.13	3.54	$0.005
Home Energy Management System	5%	13%	15	$1,747.00	7,311.38	1.45	$0.044
Central AC - Early Replacement	27%	100%	15	$3,373.96	-	0.28	$0.102
Central AC - Maintenance and Tune-Up	27%	100%	2	$175.00	-	0.05	$0.149
Central Heat Pump - Maintenance	0%	90%	2	$175.00	-	0.28	$0.024
Room AC - Removal of Second Unit	0%	38%	4	$60.00	-	4.07	$0.007
Boiler - Hot Water Reset	8%	68%	11	$37.00	7,297.42	12.05	$0.004
Boiler - Pipe Insulation	9%	38%	9	$891.26	2,313.21	0.13	$0.111
Boiler - Maintenance	22%	100%	10	$215.00	-	0.64	$0.064
Furnace - Maintenance	22%	100%	15	$215.00	475.54	0.25	$0.088
Water Heater - Drainwater Heat Recovery	1%	50%	15	$899.00	25,491.87	3.84	$0.020
Water Heater - Faucet Aerators	12%	90%	9	$16.00	1,147.23	11.32	$0.004
Water Heater - Low-Flow Showerheads	27%	75%	10	$12.00	5,230.60	78.87	$0.001
Water Heater - Pipe Insulation	9%	38%	15	$512.22	1,212.10	0.75	$0.058
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	499.03	0.47	$0.039
Water Heater - Thermostat Setback	17%	75%	2	$5.00	-	2.42	$0.003
Water Heater - Timer	5%	40%	5	$115.00	764.76	0.50	$0.037
Water Heater - Desuperheater	0%	75%	15	$1,500.00	5,098.37	1.08	$0.048
Water Heater - Solar System	0%	75%	20	$5,400.00	-	1.27	$0.051
Interior Lighting - Occupancy Sensors	5%	28%	15	$750.00	-	0.08	$0.098
Exterior Lighting - Photosensor Control	18%	45%	8	$130.00	-	0.16	$0.092
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	8%	45%	5	$115.00	-	0.07	$0.130
Refrigerator - Early Replacement	27%	100%	9	$130.00	-	0.86	$0.029
Refrigerator - Maintenance	27%	100%	4	$50.00	-	0.20	$0.049
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	-	1.95	$0.012
Freezer - Remove Second Unit	0%	25%	8	$120.00	-	1.80	$0.017
Freezer - Early Replacement	27%	100%	6	$130.00	-	0.65	$0.031
Freezer - Maintenance	27%	100%	4	$50.00	-	0.09	$0.109
Electronics - Smart Power Strip	5%	90%	4	$52.00	-	0.33	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	-	0.84	$0.023
Pool Heater - Solar System	0%	75%	20	$5,400.00	2,695.00	0.28	$0.081
ENERGY STAR Home Design	0%	0%	25	$8,544.00	-	-	$-
Information Based Energy Efficiency Programs	0%	0%	20	$270.24	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	20,018.16	1.28	$0.041
Pool/Spa cover	25%	90%	5	$115.00	3,234.00	2.31	$0.009

Table B-30 Energy Efficiency Non-Equipment Data, Multi Family Gas Only Customer, New Vintage

Measure	Base Saturation	Applicability	Lifetime (years)	Incremental Cost ($/HH)	Energy Savings (kBtu/HH)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	4%	48%	20	$534.21	1,396.84	1.13	$0.060
Insulation - Ducting	50%	75%	20	$95.00	-	3.13	$0.060
Insulation - Foundation	4%	90%	20	$251.39	4,698.29	10.33	$0.014
Insulation - Infiltration Control	19%	90%	15	$141.40	2,618.14	4.29	$0.019
Insulation - Radiant Barrier	5%	90%	20	$121.77	491.39	1.71	$0.050
Insulation - Wall Cavity	4%	90%	20	$624.58	1,691.63	0.88	$0.061
Insulation - Wall Sheathing	4%	90%	20	$458.02	4,744.90	3.66	$0.030
Ducting - Repair and Sealing	50%	50%	18	$497.62	-	0.99	$0.083
Windows - High Efficiency/ENERGY STAR	78%	90%	20	$2,270.12	1,495.05	1.02	$0.078
Windows - Install Reflective Film	2%	45%	10	$327.40	-	2.14	$0.052
Doors - Storm and Thermal	19%	75%	25	$133.00	-	-	$-
Roofs - High Reflectivity	0%	90%	20	$125.70	-	2.08	$0.069
Attic Fan - Installation	15%	23%	20	$120.48	-	-	$-
Attic Fan - Photovoltaic - Installation	5%	11%	20	$461.52	-	0.04	$0.096
Whole-House Fan - Installation	4%	19%	20	$235.67	-	-	$-
Ceiling Fan - Installation	33%	75%	10	$204.00	-	2.39	$0.049
Thermostat - Clock/Programmable	19%	25%	5	$30.00	1,513.55	2.93	$0.007
Home Energy Management System	5%	68%	15	$1,747.00	5,034.87	1.27	$0.050
Central AC - Early Replacement	9%	100%	15	$3,373.96	-	0.26	$0.105
Central AC - Maintenance and Tune-Up	9%	100%	2	$175.00	-	0.04	$0.190
Central Heat Pump - Maintenance	0%	90%	2	$175.00	-	0.12	$0.053
Room AC - Removal of Second Unit	0%	38%	4	$60.00	-	3.67	$0.008
Boiler - Hot Water Reset	15%	85%	11	$37.00	-	-	$-
Boiler - Pipe Insulation	20%	41%	9	$891.26	-	-	$-
Boiler - Maintenance	14%	100%	10	$215.00	-	0.29	$0.094
Furnace - Maintenance	14%	100%	15	$215.00	343.99	0.19	$0.094
Water Heater - Drainwater Heat Recovery	1%	90%	15	$899.00	22,037.55	3.62	$0.022
Water Heater - Faucet Aerators	0%	90%	9	$16.00	989.37	10.09	$0.004
Water Heater - Low-Flow Showerheads	26%	75%	10	$12.00	4,515.83	70.54	$0.001
Water Heater - Pipe Insulation	13%	41%	15	$512.22	1,047.47	0.68	$0.062
Water Heater - Tank Blanket/Insulation	54%	75%	5	$79.44	430.72	0.42	$0.044
Water Heater - Thermostat Setback	5%	75%	2	$5.00	-	2.44	$0.003
Water Heater - Timer	5%	40%	5	$115.00	661.13	0.44	$0.042
Water Heater - Desuperheater	0%	75%	15	$1,500.00	4,407.51	0.97	$0.052
Water Heater - Solar System	0%	75%	20	$5,400.00	-	1.14	$0.054
Interior Lighting - Occupancy Sensors	13%	28%	15	$750.00	-	0.08	$0.098
Exterior Lighting - Photosensor Control	31%	45%	8	$130.00	-	0.15	$0.094
Exterior Lighting - Photovoltaic Installation	10%	45%	12	$5,947.00	-	-	$-
Exterior Lighting - Timeclock Installation	22%	45%	5	$115.00	-	0.07	$0.133
Refrigerator - Early Replacement	9%	100%	9	$130.00	-	0.73	$0.041
Refrigerator - Maintenance	9%	100%	4	$50.00	-	0.16	$0.071
Refrigerator - Remove Second Unit	0%	38%	8	$120.00	-	1.74	$0.018
Freezer - Remove Second Unit	0%	25%	8	$120.00	-	1.64	$0.020
Freezer - Early Replacement	9%	100%	6	$130.00	-	0.57	$0.037
Freezer - Maintenance	9%	100%	4	$50.00	-	0.08	$0.126
Electronics - Smart Power Strip	5%	90%	4	$52.00	-	0.34	$0.040
Pool Pump - Timer	25%	90%	5	$115.00	-	0.61	$0.030
Pool Heater - Solar System	0%	75%	20	$5,400.00	2,695.00	0.31	$0.081
ENERGY STAR Home Design	14%	75%	25	$8,544.00	4,882.43	0.55	$0.073
Information Based Energy Efficiency Programs	0%	0%	20	$251.39	-	-	$-
Combined Boiler & Water Htg. Unit	0%	75%	15	$1,500.00	5,950.14	0.45	$0.076
Pool/Spa cover	25%	90%	5	$115.00	3,234.00	2.47	$0.009

COMMERCIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

This appendix presents detailed information for all commercial energy-efficiency measures (*equipment* and *non-equipment* measures per the LoadMAP taxonomy) that were evaluated in this study.

Table C-1 and Table C-2 provide brief narrative descriptions for all equipment and non-equipment measures that were assessed for potential.

Table C-3 through Table C-42 list the detailed unit-level data (including economic screen results) for commercial equipment measures in existing and new buildings. The column headings and units are the same as described for the corresponding residential sector tables above.

Table C-43 through Table C-82 list the detailed unit-level data (including economic screen results) for commercial non-equipment measures in existing and new construction. The column headings and units are the same as described for the corresponding residential sector tables above.

Table C-1 Commercial Energy Efficiency Equipment Measure Descriptions

Cooling	Air-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, and motors), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	Water-Cooled Chiller	A central chiller plant creates chilled water for distribution throughout the facility. Water source chillers include heat rejection via a condenser loop and cooling tower. Because of the wide variety of system types and sizes, savings and cost values for efficiency improvements represent an average over screw, reciprocating, and centrifugal technologies. Under this simplified approach, each central system is characterized by an aggregate efficiency value (inclusive of chiller, pumps, motors, and condenser loop equipment), in kW/ton with a further efficiency upgrade through the application of variable refrigerant flow technology.
Cooling	Roof Top AC	Packaged cooling systems, such as rooftop units (RTUs), are simple to install and maintain, and are commonly used in small and medium-sized commercial buildings. Applications range from a single supply system with air intake filters, supply fan, and cooling coil, or can become more complex with the addition of a return air duct, return air fan, and various controls to optimize performance. For packaged RTUs, varying Energy Efficiency Ratios (EER) are modeled, as well as a ductless mini-split system.
Cooling	Evaporative AC	An evaporative cooler (or swamp cooler) cools air through the evaporation of water. A significant amount of heat energy must be drawn from the air to drive the phase transition of liquid water to water vapor. Direct evaporative cooling passes supply air directly through a wetted media or area, thereby delivering air to a space that is both cooler and more humid. This technology is cheaper than conventional air conditioning, but is best suited for hot, dry climates. Indirect evaporative cooling passes outside air through a wetted media or area, but then uses a closed-loop heat exchanger to deliver a second stream of air that is cooler, but with unaffected humidity. Evaporative cooling technology must continually consume water to operate.
Cooling/ Heating	PTAC/PTHP	This measure includes efficiency upgrades to other small cooling systems in commercial buildings including room AC units, packaged terminal air conditioning (PTAC) units, and packaged terminal heat pumps (PTHP).
Cooling / Heating	Air-Source Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated, as well as a ductless mini-split system.
Cooling / Heating	Geothermal Heat Pump	For heat pumps, units with increasing EER and COP levels are evaluated.
Heating	Electric Furnace	Resistive heating elements are used to convert electricity directly to heat. The heat is then delivered by a supply fan and duct system to the regions that require heating.
Heating	Electric Room Heat	Resistive heating elements are used to convert electricity directly to heat. Conductive fins surrounding the element or another mechanism is used to deliver the heat directly to the surrounding room or area. These are typically either baseboard or wall-mounted units.
Ventilation	Ventilation	A variable air volume ventilation system modulates the air flow rate as needed based on the interior conditions of the building to reduce fan load, improve dehumidification, and reduce energy usage.
Water Heating	Water Heater	Efficient electric water heaters are characterized by a high recovery or thermal efficiency (percentage of delivered electric energy which is transferred to the water) and low standby losses (the ratio of heat lost per hour to the content of the stored water). Included in the savings associated with high-efficiency electric water heaters are timers that allow temperature setpoints to change

		with hot water demand patterns. For example, the heating element could be shut off throughout the night, increasing the overall energy factor of the unit. In addition, tank and pipe insulation reduces standby losses and therefore reduces the demands on the water heater. This analysis considers conventional electric water heaters and heat pump water heaters. For natural gas hot water heating, the most common type is a storage heater, which incorporates a burner, storage tank, outer jacket, insulation, and controls in a single unit. Efficient units are characterized by a high recovery or thermal efficiency and low standby losses (the ratio of heat lost per hour to the content of the stored water). A further efficiency gain is available in condensing units, which condense the water vapor produced in the combustion process and also use the heat from this condensation.
Interior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.
Interior Lighting	High-Bay Fixtures	With the exception of screw-in lighting, commercial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp Restrictions regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For High-Bay fixtures, alternatives include mercury vapor, metal halides, T5 fluorescent high output, and high-pressure sodium.
Interior Lighting	Linear Fluorescent	With the exception of screw-in lighting, commercial lighting efficiency changes typically require more than the simple purchase and installation of an alternative lamp restriction regarding ballasts, fixtures, and circuitry limit the potential for direct substitution of one lamp type for another. Also, during the buildout for a leased office space, management could decide to replace all lamps, ballasts, and fixtures with different configurations. This type of decision-making is modeled on a stock turnover basis because of the time between opportunities for upgrades. For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Exterior Lighting	Screw-in	This measure evaluates higher-efficiency alternatives for screw-in interior lamps including halogen, CFL, and LED.
Exterior Lighting	HID	Alternatives modeled include metal halides, T8 and T5 high output, high pressure sodium, and LEDs
Exterior Lighting	Linear Fluorescent	For linear fluorescent fixtures, alternatives include T12, T8, Super T8, T5, and LED.
Refrigeration	Walk-in Refrigerator	These refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Standard refrigeration compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%. Analysis assumes unit with: 140 square feet, Cooling capacity of 26,230 BTU/hr.
Refrigeration	Reach-in Refrigerator	A significant amount of energy in the commercial sector can be attributed to "reach-in" units. These stand-alone appliances can range from a residential-style refrigerator/freezer unit in an office kitchen or the breakroom of a retail store, to the larger reach-in units in foodservice applications. As in the case of residential units, these refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Analysis assumes unit with: 48 cubic feet, Cooling capacity of 3000 BTU/hr.
Refrigeration	Glass Door Display, Open Display Case	These refrigerators can be designed to perform at higher efficiency through a combination of compressor equipment upgrades, default temperature settings, and defrost patterns. Standard refrigeration compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%. Analysis assumes unit with: Cooling

		capacity of 20,000 BTU/hr
Refrigeration	Icemaker	By optimizing the timing of ice production and the type of output to the specific application, icemakers are assumed to deliver electricity savings.
Refrigeration	Vending Machine	High-efficiency vending machines incorporate more efficient compressors and lighting.
Food Preparation	Ovens, Fryers, Hot Food Containers, Dishwashers	This set of measures includes high-efficiency fryers, ovens, dishwashers, and hot food containers. Less common equipment, such as broilers and steamers, and assumed to be modeled with the other more common equipment types.
Office Equipment	Desktop Computer, Laptop, Monitors	ENERGY STAR labeled computers automatically power down to 15 watts or less when not in use and may actually last longer than conventional products because they spend a large portion of time in a low-power sleep mode. ENERGY STAR labeled computers also generate less heat than conventional models.
Office Equipment	Server	In addition to the "sleep" mode a reductions, servers have additional energy-saving opportunities through "virtualization" and other architecture solutions that involve optimal matching of computation tasks to hardware requirements
Office Equipment	Printer/Copier/Fax	ENERGY STAR labeled office equipment saves energy by powering down and "going to sleep" when not in use. ENERGY STAR labeled copiers are equipped with a feature that allows them to automatically turn off after a period of inactivity.
Office Equipment	POS Terminal	Point-of-sale terminals in retail and supermarket facilities are always on. Efficient models incorporate a high-efficiency power supply to reduce energy use.
Miscellaneous	Non-HVAC Motors	Includes motors for a variety of non-HVAC uses including vertical transportation. Premium efficiency motors can provide savings of 0.5% to 3% over standard motors. The savings results from the fact that energy efficient motors run cooler than their standard counterparts, resulting in an increase in the life of the motor insulation and bearing. In general, an efficient motor is a more reliable motor because there are fewer winding failures, longer periods between needed maintenance, and fewer forced outages. For example, using copper instead of aluminum in the windings, and increasing conductor cross-sectional area, lowers a motor's I2R losses.
Miscellaneous	Pool Pump	High-efficiency motors and two-speed pumps provide improved energy efficiency for this load.
Miscellaneous	Pool Heater	Efficient pool heaters can make use of heat pump technology to achieve significantly higher coefficients of performance in the COP=5.0 range. Gas pool heaters have a burner to heat water in a loop. Efficiency improvements can include: exhaust fan controls, electronic ignition (no pilot light), compact size and lighter weight to reduce cycling losses, and sealed combustion. Very high efficiency units, or condensing units, condense the water vapor produced in the combustion process and also use the heat from this condensation.
Miscellaneous	Miscellaneous	Improvement of miscellaneous electricity uses
Heating	Boiler	To qualify for this measure the installed equipment must be replacement of an irreparable existing boiler with a high efficiency, gas-fired steam or hot water boiler. High efficiency boilers achieve gas savings through the utilization of a sealed combustion chamber and multiple heat exchangers that remove a significant portion of the waste heat from flue gasses. Because multiple heat exchangers are used to remove waste heat from the escaping flue gasses, some of the flue gasses condense and must be drained. To qualify for this measure the installed equipment must be a boiler used 80% or more for space heating, not process, and Boiler AFUE rating must be rated greater than or equal to 85%.
Heating	Furnace	This measure covers the installation of a high efficiency gas furnace in lieu of a standard efficiency gas furnace. High efficiency gas furnaces achieve

		savings through the utilization of a sealed, super insulated combustion chamber, more efficient burners, and multiple heat exchangers that remove a significant portion of the waste heat from the flue gasses. Because multiple heat exchangers are used to remove waste heat from the escaping flue gasses, most of the flue gasses condense and must be drained. Furnaces equipped with ECM fan motors can save additional electric energy. To qualify for this measure the installed equipment must be a natural gas fired furnace with a minimum Annual Fuel Utilization Efficiency (AFUE) rating of 92% and input rating of less than 300,000 Btu/hr.
Heating	Unit Heater	In order for this characterization to apply, the efficient equipment is assumed to be a condensing unit heater up to 300 MBH with a Thermal Efficiency > 90% and the heater must be vented, and condensate drained per manufacturer specifications. The unit must be replacing existing natural gas equipment. In order for this characterization to apply, the baseline condition is assumed to be a non-condensing natural gas unit heater.
Food Preparation	Broiler, Griddle, Range, Steamer	This set of measures includes high-efficiency cooking equipment, with improved design, additional insulation, tighter-fitting door gaskets and hinges, and electronic ignition (no pilot light) where applicable.
Water Heating	Water Heater	This measure applies to installing a 67% EF gas-fired water heaters in a non-residential application that already had a gas fired water heater. Primary applications would include (but not limited to) hotels/motels, small commercial spaces, offices and restaurants. In order for this characterization to apply, the efficient equipment is assumed to be gas-fired storage water heaters with 0.67 EF installed in a non-residential application.

Table C-2 Commercial Energy Efficiency Non-Equipment Measure Descriptions

HVAC (All)	Insulation - Ceiling	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	Insulation - Ducting	Air distribution ducts can be insulated to reduce heating or cooling losses. Best results can be achieved by covering the entire surface area with insulation. Insulation material inhibits the transfer of heat through the air-supply duct. Several types of ducts and duct insulation are available, including flexible duct, pre-insulated duct, duct board, duct wrap, tacked, or glued rigid insulation, and waterproof hard shell materials for exterior ducts.
HVAC (All)	Insulation - Radiant Barrier	Radiant barriers are materials installed to reduce the heat gain in buildings. Radiant barriers are made from materials that are highly reflective and have low emissivity like aluminum. The closer the emissivity is to 0 the better they will perform. Radiant barriers can be placed above the insulation or on the roof rafters.
HVAC (All)	Insulation-Foundation	Below Grade Insulation to R6
HVAC (All)	Insulation - Wall Cavity	Thermal insulation is material or combinations of materials that are used to inhibit the flow of heat energy by conductive, convective, and radiative transfer modes. Thus, thermal insulation can conserve energy by reducing the heat loss or gain of a building. The type of building construction defines insulating possibilities. Typical insulating materials include: loose-fill (blown) cellulose; loose-fill (blown) fiberglass; and rigid polystyrene.
HVAC (All)	HVAC - Duct Repair and Sealing	Leakage in unsealed ducts varies considerably because of the differences in fabricating machinery used, the methods for assembly, installation workmanship, and age of the ductwork. Air leaks from the system to the outdoors result in a direct loss proportional to the amount of leakage and the difference in enthalpy between the outdoor air and the conditioned air. To seal ducts, a wide variety of sealing methods and products exist. Each has a relatively short shelf life, and no documented research has identified the aging characteristics of sealant applications.
HVAC (All)	Doors - High Efficiency	Like other components of the shell, doors are subject to several types of heat loss: conduction, infiltration, and radiant losses. High efficiency doors have exceptional thermal insulation properties and tight-fitting, weather-stripping on the doorframe to reduce air leakage.
HVAC (All)	Windows - High Efficiency	High-efficiency windows, such as those labeled under the ENERGY STAR Program, are designed to reduce a building's energy bill while increasing comfort for the occupants at the same time. High-efficiency windows have reducing properties that reduce the amount of heat transfer through the glazing surface. For example, some windows have a low-E coating, which is a thin film of metallic oxide coating on the glass surface that allows passage of short-wave solar energy through glass and prevents long-wave energy from escaping. Another example is double-pane glass that reduces conductive and convective heat transfer. There are also double-pane glasses that are gas-filled (usually argon) to further increase the insulating properties of the window.
HVAC (All)	Roof - High Reflectivity	The color and material of a building structure surface will determine the amount of solar radiation absorbed by that surface and subsequently transferred into a building. This is called solar absorptance. By using a living roof or a roofing material with a light color (and a lower solar absorptance), the roof will absorb less solar radiation and consequently reduce the cooling load. Living roofs also reduce stormwater runoff.
Cooling	Air-Cooled Chiller -	Resetting the condenser water temperature to the lowest possible setting

	Condenser Water Temperature Reset	allows the cooling tower to generate cooler water whenever possible and decreases the temperature lift between the condenser and the evaporator. This will generally increase chiller part-load efficiency, though it may require increased tower fan energy use.
Cooling	Air-Cooled Chiller - Economizer	Economizers allow outside air (when it is cool and dry enough) to be brought into the building space to meet cooling loads instead of using mechanically cooled interior air. A dual enthalpy economizer consists of indoor and outdoor temperature and humidity sensors, dampers, motors, and motor controls. Economizers are most applicable to temperate climates and savings will be smaller in extremely hot or humid areas.
Cooling	Air-Cooled Chiller - VSD on Fans	Variable speed drives, which reduce chiller energy use under part load, are modeled for both air-cooled and water-cooled chillers.
Cooling	Air-Cooled Chiller - Chilled Water Reset	Chilled water reset controls save energy by improving chiller performance through increasing the supply chilled water temperature, which allows increased suction pressure during low load periods. Raising the chilled water temperature also reduces chilled water piping losses. However, the primary savings from the chilled water reset measure results from chiller efficiency improvement. This is due partly to the smaller temperature difference between chilled water and ambient air, and partly due to the sensitivity of chiller performance to suction temperature.
Cooling	Air-Cooled Chiller - Chilled Water Variable-Flow System	The part-load efficiency of chilled water loops can be improved substantially by varying the flow speed of the delivered water with the building demand for cooling.
Cooling	Air-Cooled Chiller - High Efficiency Cooling Tower Fans	High-efficiency cooling fans utilize efficient components and variable frequency drives that improve fan performance by adjusting fan speed and rotation as conditions change.
Cooling	Air-Cooled Chiller - Maintenance	Filters, coils, and fins require regular cleaning and maintenance for the heat pump or roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases.
Water- Cooled Chiller	Water Cooled Chiller Condenser Water Temperature Reset	Resetting the condenser water temperature to the lowest possible setting allows the cooling tower to generate cooler water whenever possible and decreases the temperature lift between the condenser and the evaporator. This will generally increase chiller part-load efficiency, though it may require increased tower fan energy use.
Water- Cooled Chiller	Water Cooled Chiller Economizer	Economizers allow outside air (when it is cool and dry enough) to be brought into the building space to meet cooling loads instead of using mechanically cooled interior air. A dual enthalpy economizer consists of indoor and outdoor temperature and humidity sensors, dampers, motors, and motor controls. Economizers are most applicable to temperate climates and savings will be smaller in extremely hot or humid areas.
Water- Cooled Chiller	Water-Cooled Chiller VSD on Fans	Variable speed drives, which reduce chiller energy use under part load, are modeled for both air-cooled and water-cooled chillers.
Water- Cooled Chiller	Water-Cooled Chiller-Chiller Water reset	Chilled water reset controls save energy by improving chiller performance through increasing the supply chilled water temperature, which allows increased suction pressure during low load periods. Raising the chilled water temperature also reduces chilled water piping losses. However, the primary savings from the chilled water reset measure results from chiller efficiency improvement. This is due partly to the smaller temperature difference between chilled water and ambient air, and partly due to the sensitivity of chiller performance to suction temperature.
Water- Cooled Chiller	Water- Cooled Chiller Variable Flow System	The part-load efficiency of chilled water loops can be improved substantially by varying the flow speed of the delivered water with the building demand for cooling.
Water- Cooled	Water-Cooled Chiller	High-efficiency cooling fans utilize efficient components and variable

Chiller Water Cooled Chiller	High Efficiency Cooling Tower Fans	frequency drives that improve fan performance by adjusting fan speed and rotation as conditions change.
Water- Cooled Chiller	Water-Cooled Chiller Maintenance	Filters, coils, and fins require regular cleaning and maintenance for the heat pump or roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases.
Cooling	RTU - Evaporative Precooler	Evaporative precooling can improve the performance of air conditioning systems, most commonly RTUs. These systems typically use indirect evaporative cooling as a first stage to pre-cool outside air. If the evaporative system cannot meet the full cooling load, the air steam is further cooled with conventional refrigerative air conditioning technology.
Cooling	RTU - Maintenance	Regular cleaning and maintenance enables a roof top unit to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Heating	Gas Boiler –High Efficiency Hot Water Circulation	Efficiency improvements to the circulation system of a boiler's hot water loop.
Heating	Gas Boiler- Hot Water Reset	This measure relates to improving combustion efficiency by adding controls to non-residential building heating boilers to vary the boiler water supply temperature relative to heating load as a function of the outdoor air temperature to save energy. Energy is saved by increasing the temperature difference between the supply water temperature in the boiler's heat exchanger and the boiler's burner flame temperature. The flame temperature remains the same while the heating supply water temperature decreases with the decrease in heating load due to an increase in outside air temperature. A lockout temperature is also set to prevent the boiler from turning on when it is above a certain temperature outdoors.
Heating	Gas Boiler - Maintenance	Regular cleaning and maintenance enables a natural gas boiler to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Heating	Gas Furnace- Maintenance	Regular cleaning and maintenance enables a natural gas furnace to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Heating	Space Heating - Heat Recovery Ventilator	Heat recovery ventilation uses a counter-flow, air-to-air heat exchanger between inbound and outbound air flow to selectively transfer heat and reduce space heating loads.
Heating	Boiler O2 Trim Controls	An electronic sensor inserted into the boiler flue, connected to a control panel to measure oxygen and transmit signals to a control damper on the burner air supply
Heating	Insulate Steam Lines/Condensate Tank	Insulation to prevent heat loss from steam lines
Heating	Repair Malfunctioning Steam Traps	Under normal operating conditions, the valve and seat area is subjected to hot high-pressure water flow. Water is corrosive and causes surface erosion. With no maintenance, eventually the valve will fail to close properly and the trap will fail to seal and will waste steam.
Heating	Boiler Blow Down Heat Exchanger (steam)	Recovery of heat from the periodic/continuous flow of outlet waste water (to prevent sludge buildup) to preheat make-up water

Heating	Boiler Parallel Positioning Control	Modern electronic parallel positioning controls (PPC) incorporate end-device positioning signals to ensure accurate placement of fuel and air positioners for specific firing rates
Cooling / Heating	Heat Pump - Maintenance	Regular cleaning and maintenance enables a heat pump to function effectively and efficiently throughout its years of service. Neglecting necessary maintenance leads to a steady decline in performance while energy use increases. Maintenance can increase the efficiency of poorly performing equipment by as much as 10%.
Ventilation	Ventilation - ECM on VAV Boxes	ECM motors are well suited to the variable flow rates of VAV boxes. ECMs are a higher efficiency option for the air blowers and maintain efficiency better over a wide range of loads.
Ventilation	Ventilation - Variable Speed Control	Variable speed controls adjust ventilation fans for part-load conditions to reduce energy use.
Ventilation	Ventilation- CO2 Controlled	Carbon dioxide (CO2) levels indicate the level of occupancy in a space. This measure uses sensors to monitor CO2 levels and controls on the air handling system to adjust the amount of outside air accordingly. Ventilation rates are thereby controlled based on occupancy, rather than a fixed rate, thus saving HVAC energy use.
Water Heating	Water Heater - Drainwater Heat Recovery	Drainwater Heat Recovery is a system in which drain water is used to preheat cold water entering the water heater. While these systems themselves are relatively inexpensive, upgrading an existing system could be unreasonable because of demolition costs. Thus they are modeled for new vintage only.
Water Heating	Water Heater - Faucet Aerators/Low Flow Nozzles	A faucet aerator or low flow nozzle spreads the stream from a faucet helping to reduce water usage. The amount of water passing through the aerator is measured in gallons per minute (GPM) and the lower the GPM the more water the aerator conserves.
Water Heating	Water Heater - High Efficiency Circulation Pump	A high efficiency circulation pump uses an electronically commutated motor (ECM) to improve motor efficiency over a larger range of partial loads. In addition, an ECM allows for improved low RPM performance with greater torque and smaller pump dimensions.
Water Heating	Water Heater - Desuperheater	A desuperheater can be added to an existing geothermal heat pump system (typically installed with the primary function of space heating and cooling) in order to draw off a portion of the geothermal heat for water heating purposes. The system can either supplement the building's water heater, or be a full-demand water heater that meets all of the building's hot water needs.
Water Heating	Water Heater - Solar System	Solar water heating systems can be used in residential buildings that have an appropriate near-south-facing roof or nearby unshaded grounds for installing a collector. Although system types vary, in general these systems use a solar absorber surface within a solar collector or an actual storage tank. Either a heat-transfer fluid or the actual potable water flows through tubes attached to the absorber and transfers heat from it. (Systems with a separate heat-transfer-fluid loop include a heat exchanger that then heats the potable water.) The heated water is stored in a separate preheat tank or a conventional water heater tank. If additional heat is needed, it is provided by a conventional water-heating system.
Water Heating	Water Heater - Install Timer	These measures use either a programmable thermostat or a timer to adjust the water heater setpoint at times of low usage, typically when a home is unoccupied.
Water Heating	Water Heater - Pipe Insulation	Insulating hot water pipes decreases the amount of energy lost during distribution of hot water throughout the building. Insulating pipes will result in quicker delivery of hot water and allows lowering the water heating set point. There are several different types of insulation, the most common being polyethylene and neoprene.
Water Heating	Water Heater - Tank Blanket/Insulation	Insulation levels on hot water heaters can be increased by installing a fiberglass blanket on the outside of the tank. This increase in insulation

		reduces standby losses and thus saves energy. Water heater insulation is available either by the blanket or by square foot of fiberglass insulation with R-values ranging from 5 to 14.
Water Heating	Water Heater- Pre-Rinse Spray Valve	Pre-rinse valves use a spray of water to remove food waste from dishes prior to cleaning in a dishwasher. More efficient spray valves use less water thereby reducing water consumption, water heating cost, and waste water (sewer) charges. Pre-rinse spray valves include a nozzle, squeeze lever, and dish guard bumper. The primary impacts of this measure are water savings. Reduced hot water consumption saves either natural gas or electricity, depending on the type of energy the hot water heater uses. This measure applies to time of sale, retrofit and direct install and appropriate lookup tables are included to support these delivery methods.
Water Heating	Combines Boiler & Water Heating Unit	This measure applies to natural gas boilers that supply hot water for space heat and domestic hot water through on-demand supply. In order for this characterization to apply, the efficient equipment must be a condensing boiler for space heating with on-demand domestic hot water and a AFUE great than or equal to 90%. It is assumed to be installed in a non-residential space and replace existing natural gas equipment used for the same purpose.
Water Heating	Water Heater- Booster Water Heater	Gas booster heaters are used to supply sanitizing water to a dishwashing machine.
Interior Lighting	Interior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Interior Lighting	Interior Lighting - LED Exit Lighting	The lamps inside exit signs represent a significant energy end-use, since they usually operate 24 hours per day. Many old exit signs use incandescent lamps, which consume approximately 40 watts per sign. The incandescent lamps can be replaced with LED lamps that are specially designed for this specific purpose. In comparison, the LED lamps consume approximately 2-5 watts.
Interior Lighting	Interior Lighting - Occupancy Sensors	The installation of occupancy sensors allows lights to be turned off during periods when a space is unoccupied, virtually eliminating the wasted energy due to lights being left on. There are several types of occupancy sensors in the market.
Interior Lighting	Interior Lighting - Timeclocks and Timers	In many cases lighting remains on at night and during weekends. A simple timer can set a schedule for turning lights off to reduce operating hours.
Interior Lighting	Interior Lighting - Task Lighting	Individual work areas can use task lighting instead of brightly lighting the entire area. Significant energy savings can be realized by focusing light directly where it is needed and lowering the general lighting level. An example of task lighting is the common desk lamp. A 25W desk lamp can be installed in place of a typical lamp in a fixture.
Interior Lighting	Interior Fluorescent - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Interior Lighting	Interior Fluorescent - Delamp and Install Reflectors	While sometimes included in lighting retrofit projects, delamping is often performed as a separate energy efficiency measure in which a lighting engineer analyzes the lighting provided by current systems compared to the requirements of building occupants. This often leads to the removal of unnecessary lamps corresponding to an overall reduction in energy usage. In addition, installing a reflector in each fixture can improve light distribution from the remaining lamps.
Exterior Lighting	Exterior Lighting - Bi-Level Fixture	Bi-level fixtures have the ability to reduce light output to a lower level, given a control strategy that is based on a timer, occupancy sensor, motion sensor, or manual switch.
Exterior Lighting	Exterior Lighting - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.

Exterior Lighting	Exterior Lighting - Photovoltaic Installation	Solar photovoltaic generation may be used to power exterior lighting and thus eliminate all or part of the electrical energy use.
Refrigeration	Refrigerator - Anti-Sweat Heater	Anti-sweat heaters are used in virtually all low-temperature display cases and many medium-temperature cases to control humidity and prevent the condensation of water vapor on the sides and doors and on the products contained in the cases. Typically, these heaters stay on all the time, even though they only need to be on about half the time. Anti-sweat heater controls can come in the form of humidity sensors or time clocks.
Refrigeration	Refrigerator- Auto Door Closer	Anti-sweat heaters are used in virtually all low-temperature display cases and many medium-temperature cases to control humidity and prevent the condensation of water vapor on the sides and doors and on the products contained in the cases. Typically, these heaters stay on all the time, even though they only need to be on about half the time. Anti-sweat heater controls can come in the form of humidity sensors or time clocks.
Refrigeration	Refrigerator - Decommissioning	Early retirement, removal, and recycling or older, little used refrigerators and freezers removes the energy use of these inefficient, aging units.
Refrigeration	Refrigerator - Demand Defrost	Units can be designed to perform at higher efficiency with a sensing and control system that runs defrost cycles based on demand/only when necessary.
Refrigeration	Refrigerator - Door Gasket Replacement	This measure involves replacing aging door gaskets that no longer adequately seal reach-in refrigerators or glass door display cases.
Refrigeration	Refrigerator- Economizer	Economizers save energy in walk-in coolers by bringing in outside air when it is sufficiently cool, rather than operating the compressor. In addition there is a control installed to cycle evaporator fans on and off as opposed to constantly running while economizer is running. In order for this characterization to apply, the efficient equipment is assumed to be a walk-in cooler with a refrigeration economizer
Refrigeration	Refrigerator - Evaporator Fan Controls	Evaporator fan motor controls allow for part load use or demand scheduling based on variable refrigeration load requirements, reducing energy consumption.
Refrigeration	Refrigeration- High Efficiency Evaporator Fan Motors	Electronically commutated motors (ECM) operate at variable speeds.
Refrigeration	Refrigerator - Floating Head Pressure	Floating head pressure control allows the pressure in the condenser to "float" with ambient temperatures. This method reduces refrigeration compression ratios, improves system efficiency and extends the compressor life. The greatest savings with a floating head pressure approach occurs when the ambient temperatures are low, such as in the winter season. Floating head pressure control is most practical for new installations. However, retrofits installation can be completed with some existing refrigeration systems. Installing floating head pressure control increases the capacity of the compressor when temperatures are low, which may lead to short cycling.
Refrigeration	Refrigerator - Strip Curtain	Strip curtains at the entrances to large walk-in coolers or freezers, such as those used in supermarkets; reduce air transfer between the refrigerated space and the surrounding space.
Refrigeration	Refrigerator - High Efficiency Compressor	Standard compressors typically operate at approximately 65% efficiency. High-efficiency models are available that can improve compressor efficiency by 15%.
Refrigeration	Refrigerator - Variable Speed Compressor	The part-load efficiency of drive systems can be improved by varying the speed of the motor drive. An additional benefit of variable-speed controls is the ability to start and stop the motor and process gradually, thus extending the life of the motor and associated machinery.
Refrigeration	Vending Machine-Controller	Cold beverage vending machines usually operate 24 hours a day regardless of whether the surrounding area is occupied or not. The result is that the

		vending machine consumes energy unnecessarily, because it will operate all night to keep the beverage cold even when there would be no customers until the next morning. A vending machine controller can reduce energy consumption without compromising the temperature of the vended product. The controller uses an infrared sensor to monitor the surrounding area's occupancy and will power down the vending machine when the area is unoccupied. It will also monitor the room's temperature and will re-power the machine at one to three hour intervals independent of occupancy to ensure that the product stays cold.
Refrigeration	Refrigerator - eCube	The eCube consists of a solid, waxy food simulant that is fitted around a thermostat sensor that would otherwise measure air temperature. The refrigeration controls therefore attempt to regulate the temperature of food, which changes more slowly and gradually than air, thereby reducing the frequency of refrigeration cycles.
Refrigeration	Vending Machine - Controller	Cold beverage vending machines usually operate 24 hours a day regardless of whether the surrounding area is occupied or not. The result is that the vending machine consumes energy unnecessarily, because it will operate all night to keep the beverage cold even when there would be no customers until the next morning. A vending machine controller can reduce energy consumption without compromising the temperature of the vended product. The controller uses an infrared sensor to monitor the surrounding area's occupancy and will power down the vending machine when the area is unoccupied. It will also monitor the room's temperature and will re-power the machine at one to three hour intervals independent of occupancy to ensure that the product stays cold.
Refrigeration	Grocery- Display Case- LED Lighting	High-efficiency LED display case lighting not only reduces direct lighting energy use, but also reduce internal heat gains to the case from lights that must be removed by the refrigeration system.
Refrigeration	Grocery- Display Case Motion Sensors	Motion sensors reduce lighting load when area around display case is unoccupied to save energy on lighting.
Refrigeration	Grocery- ECM's for Display Cases	Replacement of shaded-pole evaporator fan motors with ECM motors in display cases allows for variable refrigeration loads to be handled. Reductions come from increased motor efficiency and the reduction of heating load.
Refrigeration	Grocery- Open Display Case- Night Covers	Night covers can be used on open refrigeration cases when a facility is closed or few customers are in the store.
Refrigeration	Refrigerator- eCube	The eCube consists of a food simulant that mimics food temperature. The thermostat regulates refrigeration temperature based upon the food temperature and not the air temperature. It is fitted to the thermostat sensor, which controls the compressor, thereby reducing the frequency of refrigeration cycles.
Food Preparation	Cooking Exhaust Hoods with Sensor Control	Improved exhaust hoods involve installing variable-speed controls on commercial kitchen hoods. These controls provide ventilation based on actual cooking loads. When grills, broilers, stoves, fryers or other kitchen appliances are not being used, the controls automatically sense the reduced load and decrease the fan speed accordingly. This results in lower energy consumption because the system is only running as needed rather than at 100% capacity at all times.
Office Equipment	Office Equipment - ENERGY STAR Power Supplies	Power supplies with an efficient ac-dc or ac-ac conversion process can obtain the ENERGY STAR label. These devices can be used to power computers, phones, and other office equipment.
Office Equipment	Office Equipment - Plug Load Occupancy Sensors	Occupancy sensors can control power strips and thus turn off energy used by plug loads, such as task lights, when an office is unoccupied.
HVAC (All)	Energy Management System	An energy management system (EMS) allows managers/owners to monitor and control the major energy-consuming systems within a commercial

		building. At the minimum, the EMS can be used to monitor and record energy consumption of the different end-uses in a building, and can control operation schedules of the HVAC and lighting systems. The monitoring function helps building managers/owners to identify systems that are operating inefficiently so that actions can be taken to correct the problem. The EMS can also provide preventive maintenance scheduling that will reduce the cost of operations and maintenance in the long run. The control functionality of the EMS allows the building manager/owner to operate building systems from one central location. The operation schedules set via the EMS help to prevent building systems from operating during unwanted or unoccupied periods. This analysis assumes that this measure is limited to buildings with a central HVAC system.
HVAC (All)	Thermostat - Clock/Programmable	A programmable thermostat can be added to most heating/cooling systems. They are typically used during winter to lower temperatures at night and in summer to increase temperatures during the afternoon. There are two-setting models, and well as models that allow separate programming for each day of the week. The energy savings from this type of thermostat are identical to those of a "setback" strategy with standard thermostats, but the convenience of a programmable thermostat makes it a much more attractive option. In this analysis, the baseline is assumed to have no thermostat setback.
Miscellaneous	Lodging- Guest Room Controls	Hotel guestrooms can be fitted with occupancy controls that turn off energy-using equipment when the guest is not using the room. The occupancy controls comes in several forms, but this analysis assumes the simplest kind, which is a simple switch near the room's entry where the guest can deposit their room key or card. If the key or card is present, then lights, TV, and air conditioning can receive power and operate. When the guest leaves and takes the key, all equipment shuts off.
HVAC, Lighting	HVAC - Occupancy Sensors	Occupancy sensors turn off or adjust HVAC settings when a space is unoccupied.
HVAC, Lighting	Commissioning - HVAC, Lighting	For new construction and major renovations, commissioning ensures that building systems are properly designed, specified, and installed to meet the design intent and provide high-efficiency performance. Commissioning begins during the design process.
HVAC, Lighting	Retrocommissioning - HVAC, Lighting	In existing buildings, the retrocommissioning process identifies low-cost or no cost measures, including controls adjustments, to improve building performance and reduce operating costs. Retrocommissioning addresses HVAC, lighting, DHW, and other major building systems.
HVAC (All)	Advanced New Construction Designs	Advanced new construction designs use an integrated approach to the design of new buildings to account for the interaction of building systems. Designs may specify the building orientation, building shell, proper sizing of equipment and systems, and controls strategies with the goal of optimizing building energy efficiency and comfort. Options that may be evaluated and incorporated include passive solar strategies, increased thermal mass, natural ventilation, energy recovery ventilation, daylighting strategies, and shading strategies. This measure is modeled for new vintage only.
HVAC, Lighting	Custom Measures	Custom measures may be included in the analysis to serve as a "catch all" for measures for which costs and savings are not easily quantified and that could be part of a custom program. Typical costs and energy savings are assumed such that the measures pass the economic screen.
Electronics	Electronics- Smart Power Strip	This measure relates to Controlled Power Strips (or Smart Strips) which are multi-plug power strips with the ability to automatically disconnect specific connected loads depending upon the power draw of a control load, also plugged into the strip. Power is disconnected from the switched (controlled) outlets when the control load power draw is reduced below a certain adjustable threshold, thus turning off the appliances plugged into the switched outlets. By disconnecting, the standby load of the controlled

		devices, the overall load of a centralized group of equipment (i.e. entertainment centers and home office) can be reduced. Uncontrolled outlets are also provided that are not affected by the control device and so are always providing power to any device plugged into it.
Electronics	Electronics- Monitor Power Management	EZ Save Monitor Power Management Software
Miscellaneous	Pool Heater - Solar	This measure replaces a conventional pool heater with a solar system.
Miscellaneous	Pool Pump - Timer	A pool pump timer allows the pump to turn off automatically, eliminating the wasted energy associated with unnecessary pumping.
Miscellaneous	Non-HVAC Motors - Variable Speed Control	The part-load efficiency of motors can be improved by varying the speed of the motor drive. There are two major types of variable speed controls: mechanical and electronic. An additional benefit of variable-speed controls is the ability to start and stop the motor gradually, thus extending the life of the motor and associated machinery. This analysis assumes that electronic variable speed controls are installed.
Miscellaneous	Destratification Fans (HVLS)	High volume low-speed (HVLS) ceiling fans are large (8-ft. to 20-ft. in diameter). They will effectively mix and circulate air within a given space to equalize temperature between ceiling and floor levels.
Miscellaneous	Exhaust Hood Makeup Air	Install dedicated make-up air supply for exhaust hoods. Exhaust hoods remove heat and vapor associated with cooking processes. An equal volume of makeup air must replace the air removed through the kitchen exhaust hood.
Miscellaneous	Optimizing Kitchen Ventilation	Customized optimization strategies that are site specific - very difficult to quantify typical savings. Optimizing the kitchen ventilation system in new construction or major renovation to achieve optimum performance and energy efficiency.

Table C-3 Energy Efficiency Equipment Data, Electric-Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.45	$0.24	20	2.59	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.54	$0.27	20	2.75	$0.04
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.13	$0.30	20	5.13	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.20	$0.34	20	4.93	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.52	$0.10	20	7.08	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.59	$0.11	20	7.49	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.69	$0.13	20	7.34	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.83	$0.20	20	5.66	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.86	$0.22	20	5.33	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.93	$0.25	20	5.25	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.30	$0.02	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.61	$0.02	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.80	$0.07	15	4.09	$0.01
Cooling	Roof top AC	Ductless Minisplit	1.00	$0.23	15	1.97	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.33	$0.02	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.53	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.70	$0.09	15	2.29	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.77	$0.13	15	2.13	$0.02
Cooling	Air Source Heat Pump	Ductless Minisplit	0.97	$0.22	15	2.31	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.18	$0.05	15	4.29	$0.03
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.34	$0.10	15	3.81	$0.03
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.82	$0.14	15	6.85	$0.02
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.10	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.23	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.26	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.34	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.10	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.23	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.26	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.34	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.28	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.72	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.01	$0.01	15	-	$0.08
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.02	$0.00	15	1.00	$0.01
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.03	$0.03	15	0.13	$0.11
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.03	$0.05	15	0.09	$0.17
Heating	Air Source Heat Pump	Ductless Minisplit	0.03	$0.08	15	0.09	$0.23
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.07	$0.02	15	1.94	$0.03
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.17	$0.04	15	2.17	$0.02
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.43	$0.05	15	4.12	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.01	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.05	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.13	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.15	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.20	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.15	($0.07)	10	1.00	($0.01)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	2.16	$0.03
Water Heating	Water Heating	EF 2.0	0.33	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.37	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.38	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.38	$0.01	3	1.64	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.58	$0.02	3	2.29	$0.01
Interior Lighting	Screw-in	CFL	1.09	$0.01	2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.18	$0.12	20	4.85	$0.01
Interior Lighting	Screw-in	LED (2020)	1.36	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.12	$0.06	15	-	$0.05
Interior Lighting	High-Bay Fixtures	T8	0.12	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.15	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.22	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.79	$2.18	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	0.82	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.14	$0.32	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1.32	$0.24	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.46	$0.60	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.06	$0.00	3	1.82	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.10	$0.00	3	2.32	$0.01
Exterior Lighting	Screw-in	CFL	0.18	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.20	$0.05	20	2.04	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.23	$0.01	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.16	$0.21	15	0.19	$0.13
Exterior Lighting	HID	T8	0.17	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.18	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.21	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.21	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.31	$0.05	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.01	$0.02	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.01	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.01	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.01	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.02	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.06	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.07	$0.00	12	3.09	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.00	12	-	$0.04
Refrigeration	Open Display Case	4330 kWh/yr	0.02	$0.00	12	1.26	$0.02
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.00	$0.00	10	0.51	$0.10
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.00	10	0.51	$0.10
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	0.51	$0.10
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	2.80	$0.02
Refrigeration	Vending Machine	2400 kWh/year	0.02	$0.00	12	2.80	$0.02
Refrigeration	Vending Machine	1700 kWh/year	0.03	$0.00	12	6.05	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.23	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.15	-	12	-	-
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	1.21	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.78	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.69	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.11	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.08	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.08	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	4	0.73	$0.06
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	6.63	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	6.63	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.01	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-4 Energy Efficiency Equipment Data, Natural Gas-Office, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.04	16	1.57	$0.37
Heating	Furnace	EF .82	0.02	$0.12	16	0.85	$0.69
Heating	Furnace	EF .90	0.04	$0.10	16	2.07	$0.28
Heating	Furnace	EF .96	0.05	$0.15	16	1.91	$0.31
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.04	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.06	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.09	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.13	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	2.57	$0.21
Water Heating	Water Heating	Tankless	0.01	$0.02	12	1.93	$0.28
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	5.04	$0.11
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.09	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.16	$0.01	12	> 10	$0.00
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.13	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.02	$0.00	12	> 10	$0.00
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.08	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.39	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.05	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-5 Energy Efficiency Equipment Data Electric-Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.38	$0.26	20	2.03	$0.06
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.46	$0.30	20	2.15	$0.06
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.96	$0.33	20	4.03	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.02	$0.36	20	3.87	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.39	$0.10	20	5.29	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.44	$0.11	20	5.59	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.52	$0.13	20	5.49	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.62	$0.20	20	4.23	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.64	$0.22	20	3.98	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.70	$0.25	20	3.92	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.25	$0.02	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.50	$0.02	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.65	$0.06	15	3.86	$0.01
Cooling	Roof top AC	Ductless Minisplit	0.81	$0.20	15	1.86	$0.03
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.27	$0.02	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.43	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.57	$0.08	15	2.17	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.63	$0.11	15	2.01	$0.02
Cooling	Air Source Heat Pump	Ductless Minisplit	0.79	$0.19	15	2.18	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.19	$0.05	15	4.04	$0.03
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.35	$0.11	15	3.59	$0.03
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.86	$0.15	15	6.45	$0.02
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.09	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.21	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.24	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.31	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.09	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.21	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.24	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.31	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.28	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.72	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.03	$0.01	15	-	$0.03
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.07	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.10	$0.04	15	0.46	$0.04
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.10	$0.06	15	0.31	$0.06
Heating	Air Source Heat Pump	Ductless Minisplit	0.13	$0.09	15	0.36	$0.07
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.08	$0.02	15	2.06	$0.03
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.19	$0.04	15	2.31	$0.02
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.49	$0.06	15	4.38	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.00	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.00	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.00	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.05	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.11	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11	0.13	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.18	$0.00	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.59	($0.12)	10	1.00	($0.01)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	2.37	$0.03
Water Heating	Water Heating	EF 2.0	0.31	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.35	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.36	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.38	$0.01	3	1.64	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.58	$0.02	3	2.29	$0.01
Interior Lighting	Screw-in	CFL	1.09	$0.01	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.18	$0.12	20	4.85	$0.01
Interior Lighting	Screw-in	LED (2020)	1.36	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.12	$0.06	15	-	$0.05
Interior Lighting	High-Bay Fixtures	T8	0.12	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.15	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.22	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.79	$2.18	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	0.82	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.14	$0.32	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1.32	$0.24	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.46	$0.60	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.06	$0.00	3	1.82	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.10	$0.00	3	2.32	$0.01
Exterior Lighting	Screw-in	CFL	0.18	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.20	$0.05	20	2.04	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.23	$0.01	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.16	$0.21	15	0.19	$0.13
Exterior Lighting	HID	T8	0.17	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.18	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.21	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.21	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.31	$0.05	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.01	$0.02	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.01	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.01	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.01	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.02	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	-	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	-	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.01	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.02	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.06	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.07	$0.00	12	3.09	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.00	12	-	$0.04
Refrigeration	Open Display Case	4330 kWh/yr	0.02	$0.00	12	1.26	$0.02
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.00	$0.00	10	0.51	$0.10
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.00	10	0.51	$0.10
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	0.51	$0.10
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	2.80	$0.02
Refrigeration	Vending Machine	2400 kWh/year	0.02	$0.00	12	2.80	$0.02
Refrigeration	Vending Machine	1700 kWh/year	0.03	$0.00	12	6.05	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.23	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.15	-	12	-	-
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	1.21	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.78	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.69	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.11	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.08	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.08	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	4	0.73	$0.06
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	6.63	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	6.63	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.01	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-6 Energy Efficiency Equipment Data, Natural Gas-Office, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.04	16	2.01	$0.29
Heating	Furnace	EF .82	0.02	$0.11	16	1.09	$0.54
Heating	Furnace	EF .90	0.04	$0.10	16	2.64	$0.22
Heating	Furnace	EF .96	0.06	$0.14	16	2.44	$0.24
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.04	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.06	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.09	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.13	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	2.35	$0.23
Water Heating	Water Heating	Tankless	0.01	$0.02	12	1.77	$0.30
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	4.61	$0.12
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.09	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.16	$0.01	12	> 10	$0.00
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.13	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.02	$0.00	12	> 10	$0.00
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.08	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.39	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.05	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-7 Energy Efficiency Equipment Data, Electric-Restaurant, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.97	$0.38	20	3.06	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1.17	$0.43	20	3.25	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2.43	$0.48	20	6.07	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.58	$0.53	20	5.84	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.58	$0.24	20	7.97	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.79	$0.26	20	8.44	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	2.11	$0.31	20	8.27	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.53	$0.48	20	6.39	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.64	$0.53	20	6.01	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.85	$0.58	20	5.92	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.55	$0.02	15	-	$0.00
Cooling	Roof top AC	EER 11.2	1.09	$0.02	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	1.43	$0.07	15	6.56	$0.00
Cooling	Roof top AC	Ductless Minisplit	1.79	$0.22	15	3.16	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.76	$0.03	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	1.22	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.61	$0.11	15	3.68	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.77	$0.16	15	3.42	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	2.24	$0.27	15	3.71	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.43	$0.06	15	6.89	$0.01
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.78	$0.12	15	6.13	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1.90	$0.17	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.17	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.41	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.47	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.62	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.17	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.41	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.47	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.62	$0.02	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.51	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.30	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.06	$0.02	15	-	$0.03
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.12	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.18	$0.07	15	0.44	$0.04
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.18	$0.10	15	0.30	$0.06
Heating	Air Source Heat Pump	Ductless Minisplit	0.23	$0.16	15	0.33	$0.07
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.15	$0.05	15	1.70	$0.03
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.35	$0.09	15	1.91	$0.03
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.89	$0.13	15	3.62	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.02	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.09	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.22	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.26	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.35	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.78	($0.52)	10	1.00	($0.04)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.07	$0.01	15	4.55	$0.01
Water Heating	Water Heating	EF 2.0	3.56	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	4.00	$0.03	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	4.12	$0.03	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	1.48	$0.05	3	2.07	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	2.27	$0.06	3	2.79	$0.01
Interior Lighting	Screw-in	CFL	4.26	$0.02	2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	4.61	$0.39	20	6.07	$0.01
Interior Lighting	Screw-in	LED (2020)	5.32	$0.11	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.66	$0.26	15	0.22	$0.04
Interior Lighting	High-Bay Fixtures	T8	0.67	($0.02)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.71	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.83	$0.02	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.85	$0.02	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	1.27	$0.06	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.78	$1.78	15	1.00	$0.23
Interior Lighting	Linear Fluorescent	T8	0.81	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.13	$0.26	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	1.31	$0.20	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.44	$0.49	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.13	$0.00	3	2.20	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.20	$0.01	3	2.81	$0.01
Exterior Lighting	Screw-in	CFL	0.37	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.41	$0.09	20	2.47	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.47	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	1.09	$1.17	15	0.24	$0.11
Exterior Lighting	HID	T8	1.12	($0.03)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	1.19	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	1.39	$0.03	15	1.00	$0.00
Exterior Lighting	HID	T5	1.42	$0.03	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	2.09	$0.30	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.23
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	1.19	$0.03	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	1.32	$0.10	12	6.53	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	1.50	$0.17	12	4.12	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.29	$0.01	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.39	$0.02	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.41	$0.02	12	> 10	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.55	$0.02	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.51	$0.11	12	-	$0.03
Refrigeration	Glass Door Display	8400 kWh/yr	1.27	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	1.60	$0.11	12	1.42	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.25	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.26	$0.17	12	-	$0.08
Refrigeration	Open Display Case	4330 kWh/yr	0.46	$0.17	12	0.58	$0.04
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.08	$0.14	10	0.23	$0.23
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.14	$0.23	10	0.23	$0.23
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.20	$0.34	10	0.23	$0.23
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.08	$0.03	12	1.28	$0.04
Refrigeration	Vending Machine	2400 kWh/year	0.27	$0.10	12	1.28	$0.04
Refrigeration	Vending Machine	1700 kWh/year	0.35	$0.06	12	2.78	$0.02
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.97	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.61	$0.02	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	2.53	$0.05	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	1.62	$0.07	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.11	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.10	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.03	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.06	$0.03	4	0.31	$0.13
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-8 Energy Efficiency Equipment Data, Natural Gas- Restaurant, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.03	16	2.29	$0.25
Heating	Furnace	EF .82	0.02	$0.09	16	1.24	$0.47
Heating	Furnace	EF .90	0.04	$0.08	16	3.01	$0.19
Heating	Furnace	EF .96	0.05	$0.11	16	2.78	$0.21
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.03	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.06	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.08	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.12	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.02	12	3.56	$0.15
Water Heating	Water Heating	Tankless	0.02	$0.04	12	2.67	$0.20
Water Heating	Water Heating	Indirect Fired	0.04	$0.03	12	7.05	$0.08
Water Heating	Water Heating	EF 0.94	0.07	($0.01)	12	1.00	($0.01)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.08	$0.18	12	2.15	$0.25
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.07	$0.05	12	6.33	$0.09
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.01	$0.00	12	> 10	$0.04
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.04	$0.01	12	> 10	$0.02
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.20	$0.01	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	$0.00	12	> 10	$0.00
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-9 Energy Efficiency Equipment Data, Electric—Restaurant, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.79	$0.55	20	1.71	$0.06
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.95	$0.63	20	1.82	$0.06
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.97	$0.70	20	3.39	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2.09	$0.77	20	3.26	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.26	$0.34	20	4.52	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.43	$0.36	20	4.78	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.69	$0.43	20	4.69	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2.02	$0.67	20	3.61	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2.11	$0.74	20	3.40	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2.28	$0.82	20	3.35	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.40	$0.02	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.80	$0.03	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	1.05	$0.08	15	4.02	$0.01
Cooling	Roof top AC	Ductless Minisplit	1.31	$0.27	15	1.93	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.56	$0.04	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.89	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.19	$0.13	15	2.26	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.30	$0.19	15	2.09	$0.02
Cooling	Air Source Heat Pump	Ductless Minisplit	1.64	$0.33	15	2.27	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.33	$0.08	15	4.22	$0.02
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.60	$0.16	15	3.75	$0.03
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1.46	$0.21	15	6.73	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.16	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.37	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.43	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.57	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.16	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.37	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.43	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.57	$0.02	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.51	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.30	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.06	$0.02	15	-	$0.04
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.11	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.16	$0.07	15	0.37	$0.05
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.16	$0.11	15	0.25	$0.07
Heating	Air Source Heat Pump	Ductless Minisplit	0.20	$0.18	15	0.28	$0.09
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.06	15	1.32	$0.04
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.33	$0.12	15	1.48	$0.04
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.85	$0.16	15	2.80	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.01	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.08	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.20	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.23	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.31	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	2.20	($0.89)	10	1.00	($0.05)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.07	$0.01	15	4.55	$0.01
Water Heating	Water Heating	EF 2.0	3.38	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	3.80	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	3.91	$0.03	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	1.48	$0.05	3	2.07	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	2.27	$0.06	3	2.79	$0.01
Interior Lighting	Screw-in	CFL	4.26	$0.02	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	4.61	$0.39	20	6.07	$0.01
Interior Lighting	Screw-in	LED (2020)	5.32	$0.11	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.66	$0.26	15	0.22	$0.04
Interior Lighting	High-Bay Fixtures	T8	0.67	($0.02)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.71	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.83	$0.02	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.85	$0.02	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	1.27	$0.06	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.78	$1.78	15	1.00	$0.23
Interior Lighting	Linear Fluorescent	T8	0.81	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.13	$0.26	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	1.31	$0.20	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.44	$0.49	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.13	$0.00	3	2.20	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.20	$0.01	3	2.81	$0.01
Exterior Lighting	Screw-in	CFL	0.37	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.41	$0.09	20	2.47	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.47	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	1.09	$1.17	15	0.24	$0.11
Exterior Lighting	HID	T8	1.12	($0.03)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	1.19	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	1.39	$0.03	15	1.00	$0.00
Exterior Lighting	HID	T5	1.42	$0.03	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	2.09	$0.30	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.23
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	1.19	$0.03	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	1.32	$0.10	12	6.53	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	1.50	$0.17	12	4.12	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.29	$0.01	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.39	$0.02	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.41	$0.02	12	> 10	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.55	$0.02	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.51	$0.11	12	-	$0.03
Refrigeration	Glass Door Display	8400 kWh/yr	1.27	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	1.60	$0.11	12	1.42	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.25	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.26	$0.17	12	-	$0.08
Refrigeration	Open Display Case	4330 kWh/yr	0.46	$0.17	12	0.58	$0.04
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.08	$0.14	10	0.23	$0.23
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.14	$0.23	10	0.23	$0.23
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.20	$0.34	10	0.23	$0.23
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.08	$0.03	12	1.28	$0.04
Refrigeration	Vending Machine	2400 kWh/year	0.27	$0.10	12	1.28	$0.04
Refrigeration	Vending Machine	1700 kWh/year	0.35	$0.06	12	2.78	$0.02
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.97	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.61	$0.02	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	2.53	$0.05	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	1.62	$0.07	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.11	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.10	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.03	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.06	$0.03	4	0.31	$0.13
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-10 Energy Efficiency Equipment Data, Natural Gas-Restaurant, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.03	16	2.36	$0.25
Heating	Furnace	EF .82	0.02	$0.08	16	1.28	$0.46
Heating	Furnace	EF .90	0.04	$0.07	16	3.10	$0.19
Heating	Furnace	EF .96	0.05	$0.10	16	2.87	$0.20
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.02	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.05	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.07	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.02	12	3.82	$0.14
Water Heating	Water Heating	Tankless	0.02	$0.03	12	2.87	$0.19
Water Heating	Water Heating	Indirect Fired	0.04	$0.03	12	7.51	$0.07
Water Heating	Water Heating	EF 0.94	0.06	($0.01)	12	1.00	($0.01)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.08	$0.18	12	2.15	$0.25
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.07	$0.05	12	6.33	$0.09
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.01	$0.00	12	> 10	$0.04
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.04	$0.01	12	> 10	$0.02
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.20	$0.01	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	$0.00	12	> 10	$0.00
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-11 Energy Efficiency Equipment Data, Electric-Retail, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.33	$0.13	20	3.52	$0.04
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.40	$0.15	20	3.74	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.83	$0.17	20	6.99	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.88	$0.18	20	6.72	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.48	$0.07	20	9.25	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.55	$0.08	20	9.79	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.64	$0.10	20	9.60	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.77	$0.15	20	7.41	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.81	$0.16	20	6.97	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.87	$0.18	20	6.87	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.35	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.71	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.93	$0.04	15	8.68	$0.00
Cooling	Roof top AC	Ductless Minisplit	1.16	$0.13	15	4.17	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.39	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.62	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.82	$0.05	15	4.87	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.90	$0.07	15	4.52	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	1.13	$0.12	15	4.91	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.22	$0.03	15	9.11	$0.01
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.39	$0.06	15	8.10	$0.01
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.96	$0.08	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.11	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.26	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.30	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.40	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.11	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.26	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.30	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.40	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.33	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.84	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.00	$0.08	15	-	$2.82
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.01	$0.01	15	1.00	$0.21
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.01	$0.31	15	0.00	$5.12
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.01	$0.45	15	0.00	$7.59
Heating	Air Source Heat Pump	Ductless Minisplit	0.01	$0.77	15	0.00	$12.39
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.13	$0.16	15	0.42	$0.13
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.30	$0.32	15	0.47	$0.11
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.76	$0.44	15	0.90	$0.06

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.02	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.09	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.21	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.25	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.34	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.64	($0.24)	10	1.00	($0.05)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	3.03	$0.02
Water Heating	Water Heating	EF 2.0	0.39	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.43	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.45	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.18	$0.01	3	1.53	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.28	$0.01	3	2.06	$0.01
Interior Lighting	Screw-in	CFL	0.52	$0.00	2.2	9.72	$0.00
Interior Lighting	Screw-in	LED (2010)	0.57	$0.06	20	4.48	$0.01
Interior Lighting	Screw-in	LED (2020)	0.65	$0.02	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.11	$0.06	15	0.17	$0.06
Interior Lighting	High-Bay Fixtures	T8	0.11	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.14	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.14	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.21	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1.24	$3.84	15	1.00	$0.32
Interior Lighting	Linear Fluorescent	T8	1.29	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.79	$0.56	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	2.08	$0.43	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	LED (2020)	3.88	$1.06	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.21	$0.01	3	1.63	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.32	$0.01	3	2.07	$0.01
Exterior Lighting	Screw-in	CFL	0.61	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.66	$0.19	20	1.82	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.76	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.18	$0.26	15	0.17	$0.15
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.20	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.23	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.35	$0.07	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.32
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.15	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.17	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.20	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.04	$0.00	12	9.17	$0.01
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.05	$0.00	12	6.37	$0.01
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.05	$0.00	12	5.72	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.07	$0.01	12	6.82	$0.01
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.07	$0.01	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.17	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.21	$0.01	12	2.63	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.03	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.03	$0.01	12	-	$0.04
Refrigeration	Open Display Case	4330 kWh/yr	0.06	$0.01	12	1.08	$0.02
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	$0.02	10	0.43	$0.12
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.04	$0.03	10	0.43	$0.12
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.05	$0.05	10	0.43	$0.12
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.02	$0.00	12	2.36	$0.02
Refrigeration	Vending Machine	2400 kWh/year	0.07	$0.01	12	2.36	$0.02
Refrigeration	Vending Machine	1700 kWh/year	0.09	$0.01	12	5.10	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.10	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.06	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.54	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.34	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.06	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.06	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.01	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.03	$0.02	4	0.31	$0.13
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-12 Energy Efficiency Equipment Data, Natural Gas-Retail, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.02	$0.37	16	0.25	$2.33
Heating	Furnace	EF .82	0.02	$1.01	16	0.14	$4.30
Heating	Furnace	EF .90	0.05	$0.88	16	0.33	$1.77
Heating	Furnace	EF .96	0.07	$1.28	16	0.30	$1.92
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.03	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.05	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.07	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.11	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.04	$0.01	15	> 10	$0.02
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.01	12	3.18	$0.17
Water Heating	Water Heating	Tankless	0.01	$0.02	12	2.39	$0.23
Water Heating	Water Heating	Indirect Fired	0.02	$0.01	12	6.26	$0.09
Water Heating	Water Heating	EF 0.94	0.03	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.28	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.47	$0.00	12	> 10	$0.00
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.40	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.07	-	12	-	-
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.24	-	12	-	-
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	1.17	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.14	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-13 Energy Efficiency Equipment Data, Electric-Retail, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.30	$0.18	20	2.40	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.36	$0.20	20	2.55	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.75	$0.22	20	4.76	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.79	$0.25	20	4.57	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.39	$0.09	20	6.03	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.45	$0.10	20	6.38	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.52	$0.12	20	6.25	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.63	$0.18	20	4.82	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.66	$0.20	20	4.54	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.71	$0.22	20	4.47	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.27	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.54	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.71	$0.03	15	7.75	$0.00
Cooling	Roof top AC	Ductless Minisplit	0.88	$0.11	15	3.73	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.32	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.51	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.68	$0.05	15	4.35	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.75	$0.07	15	4.04	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.95	$0.12	15	4.38	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.21	$0.03	15	8.14	$0.01
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.38	$0.06	15	7.23	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.93	$0.08	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.10	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.24	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.28	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.37	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.10	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.24	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.28	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.37	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.33	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.84	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.03	$0.04	15	-	$0.17
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.05	$0.01	15	1.00	$0.01
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.08	$0.16	15	0.09	$0.21
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.08	$0.24	15	0.06	$0.31
Heating	Air Source Heat Pump	Ductless Minisplit	0.11	$0.40	15	0.07	$0.39
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.09	15	0.79	$0.07
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.33	$0.19	15	0.89	$0.06
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.84	$0.26	15	1.69	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.01	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.08	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.19	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.23	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.31	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.07	($0.41)	10	1.00	($0.74)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	3.13	$0.02
Water Heating	Water Heating	EF 2.0	0.37	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.41	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.43	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.18	$0.01	3	1.53	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.28	$0.01	3	2.06	$0.01
Interior Lighting	Screw-in	CFL	0.52	$0.00	2.2	9.72	$0.00
Interior Lighting	Screw-in	LED (2010)	0.57	$0.06	20	4.48	$0.01
Interior Lighting	Screw-in	LED (2020)	0.65	$0.02	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.11	$0.06	15	0.17	$0.06
Interior Lighting	High-Bay Fixtures	T8	0.11	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.14	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.14	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.21	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1.24	$3.84	15	1.00	$0.32
Interior Lighting	Linear Fluorescent	T8	1.29	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.79	$0.56	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	2.08	$0.43	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	LED (2020)	3.88	$1.06	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.21	$0.01	3	1.63	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.32	$0.01	3	2.07	$0.01
Exterior Lighting	Screw-in	CFL	0.61	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.66	$0.19	20	1.82	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.76	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.18	$0.26	15	0.17	$0.15
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.20	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.23	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.35	$0.07	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.32
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.15	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.17	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.20	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.04	$0.00	12	9.17	$0.01
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.05	$0.00	12	6.37	$0.01
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.05	$0.00	12	5.72	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.07	$0.01	12	6.82	$0.01
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.07	$0.01	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.17	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.21	$0.01	12	2.63	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.03	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.03	$0.01	12	-	$0.04
Refrigeration	Open Display Case	4330 kWh/yr	0.06	$0.01	12	1.08	$0.02
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	$0.02	10	0.43	$0.12
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.04	$0.03	10	0.43	$0.12
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.05	$0.05	10	0.43	$0.12
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.02	$0.00	12	2.20	$0.03
Refrigeration	Vending Machine	2400 kWh/year	0.07	$0.01	12	2.20	$0.03
Refrigeration	Vending Machine	1700 kWh/year	0.09	$0.01	12	4.77	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.10	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.06	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.54	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.34	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.06	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.06	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.01	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.03	$0.02	4	0.31	$0.13
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-14 Energy Efficiency Equipment Data, Natural Gas-Retail, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.02	$0.17	16	0.54	$1.08
Heating	Furnace	EF .82	0.02	$0.47	16	0.29	$1.99
Heating	Furnace	EF .90	0.05	$0.41	16	0.71	$0.82
Heating	Furnace	EF .96	0.07	$0.59	16	0.66	$0.89
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.02	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.04	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.06	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.08	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.04	$0.01	15	> 10	$0.02
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.01	12	3.29	$0.16
Water Heating	Water Heating	Tankless	0.01	$0.02	12	2.47	$0.22
Water Heating	Water Heating	Indirect Fired	0.02	$0.01	12	6.44	$0.08
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.28	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.47	$0.00	12	> 10	$0.00
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.40	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.07	-	12	-	-
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.24	-	12	-	-
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	1.17	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.14	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-15 Energy Efficiency Equipment Data, Electric-Grocery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.68	$0.27	20	7.43	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.82	$0.30	20	7.89	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.71	$0.34	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.81	$0.37	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	1.02	$0.15	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1.16	$0.16	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.36	$0.20	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.63	$0.31	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.70	$0.34	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.84	$0.37	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.75	$0.17	15	-	$0.02
Cooling	Roof top AC	EER 11.2	1.50	$0.20	15	1.00	$0.01
Cooling	Roof top AC	EER 12.0	1.96	$0.63	15	2.36	$0.03
Cooling	Roof top AC	Ductless Minisplit	2.46	$2.08	15	1.13	$0.09
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.82	$0.21	15	-	$0.03
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	1.30	$0.03	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.72	$0.78	15	1.32	$0.05
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.89	$1.16	15	1.23	$0.06
Cooling	Air Source Heat Pump	Ductless Minisplit	2.39	$1.96	15	1.34	$0.08
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.45	$0.43	15	2.47	$0.10
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.82	$0.89	15	2.19	$0.11
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	2.02	$1.21	15	3.94	$0.06
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.24	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.56	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.64	$0.03	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.85	$0.03	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.24	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.56	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.64	$0.03	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.85	$0.03	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.70	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.78	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.02	$0.10	15	-	$0.41
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.04	$0.01	15	1.00	$0.03
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.06	$0.35	15	0.03	$0.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.06	$0.52	15	0.02	$0.87
Heating	Air Source Heat Pump	Ductless Minisplit	0.08	$0.88	15	0.02	$1.20
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.21	$0.18	15	0.59	$0.09
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.48	$0.38	15	0.67	$0.08
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.25	$0.51	15	1.26	$0.04

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.02	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.02	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.11	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.25	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.29	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.40	$0.02	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	2.17	($0.29)	10	1.00	($0.02)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	3.07	$0.02
Water Heating	Water Heating	EF 2.0	1.25	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.40	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.45	$0.02	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.40	$0.01	3	2.21	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.61	$0.02	3	3.08	$0.01
Interior Lighting	Screw-in	CFL	1.14	$0.01	2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.24	$0.09	20	6.54	$0.01
Interior Lighting	Screw-in	LED (2020)	1.43	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.08	$0.03	15	-	$0.04
Interior Lighting	High-Bay Fixtures	T8	0.08	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.08	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.10	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.10	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.15	$0.01	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	2.69	$5.53	15	1.00	$0.21
Interior Lighting	Linear Fluorescent	T8	2.80	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	3.89	$0.81	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	4.51	$0.62	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	8.40	$1.52	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.10	$0.00	3	2.45	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.15	$0.00	3	3.12	$0.01
Exterior Lighting	Screw-in	CFL	0.29	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.31	$0.06	20	2.74	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.36	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.46	$0.44	15	0.26	$0.10
Exterior Lighting	HID	T8	0.47	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.50	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.59	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.60	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.88	$0.11	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.01	$0.02	15	1.00	$0.21
Exterior Lighting	Linear Fluorescent	T8	0.01	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.02	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.02	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.04	$0.01	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	2.08	$0.04	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	2.33	$0.12	12	9.75	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	2.63	$0.21	12	6.16	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.15	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.20	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.20	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.28	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	2.57	$0.57	12	-	$0.03
Refrigeration	Glass Door Display	8400 kWh/yr	6.36	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	8.03	$0.57	12	1.42	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	1.24	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	1.29	$0.87	12	-	$0.08
Refrigeration	Open Display Case	4330 kWh/yr	2.28	$0.87	12	0.58	$0.05
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	$0.04	10	0.23	$0.23
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.03	$0.06	10	0.23	$0.23
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.05	$0.09	10	0.23	$0.23
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.04	$0.02	12	1.28	$0.04
Refrigeration	Vending Machine	2400 kWh/year	0.14	$0.05	12	1.28	$0.04
Refrigeration	Vending Machine	1700 kWh/year	0.18	$0.03	12	2.76	$0.02
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.11	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.07	$0.00	12	9.36	$0.01
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.56	$0.01	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.36	$0.06	12	3.76	$0.02
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.07	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.01	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.05	$0.03	4	0.26	$0.16
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-16 Energy Efficiency Equipment Data, Natural Gas-Grocery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.04	16	2.29	$0.25
Heating	Furnace	EF .82	0.02	$0.10	16	1.24	$0.47
Heating	Furnace	EF .90	0.04	$0.09	16	3.01	$0.19
Heating	Furnace	EF .96	0.06	$0.13	16	2.78	$0.21
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.03	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.05	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.07	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.10	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	3.22	$0.17
Water Heating	Water Heating	Tankless	0.01	$0.02	12	2.41	$0.22
Water Heating	Water Heating	Indirect Fired	0.02	$0.01	12	6.30	$0.09
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	6.76	$0.08
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.01	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.04	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-17 Energy Efficiency Equipment Data, Electric-Grocery, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.55	$0.39	20	4.15	$0.06
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.66	$0.44	20	4.41	$0.06
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.38	$0.49	20	8.24	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.47	$0.54	20	7.92	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.82	$0.22	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.92	$0.23	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.09	$0.28	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.31	$0.43	20	8.78	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.36	$0.48	20	8.26	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.47	$0.53	20	8.13	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.54	$0.16	15	-	$0.03
Cooling	Roof top AC	EER 11.2	1.09	$0.18	15	1.00	$0.02
Cooling	Roof top AC	EER 12.0	1.43	$0.59	15	1.85	$0.04
Cooling	Roof top AC	Ductless Minisplit	1.79	$1.92	15	0.89	$0.11
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.65	$0.22	15	-	$0.03
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	1.04	$0.03	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.38	$0.80	15	1.04	$0.06
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.51	$1.18	15	0.97	$0.08
Cooling	Air Source Heat Pump	Ductless Minisplit	1.91	$1.99	15	1.05	$0.11
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.42	$0.51	15	1.94	$0.13
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.77	$1.05	15	1.72	$0.14
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1.87	$1.43	15	3.09	$0.08
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.22	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.51	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.59	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.78	$0.03	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.22	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.51	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.59	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.78	$0.03	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.70	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.78	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.02	$0.12	15	-	$0.56
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.04	$0.02	15	1.00	$0.04
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.06	$0.46	15	0.02	$0.78
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.06	$0.68	15	0.01	$1.15
Heating	Air Source Heat Pump	Ductless Minisplit	0.08	$1.15	15	0.01	$1.57
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.17	$0.25	15	0.35	$0.15
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.39	$0.51	15	0.39	$0.14
Heating	Geothermal Heat Pump	EER 30, COP 5.0	.00	$0.70	15	0.74	$0.07

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.01	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.09	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.22	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.26	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.36	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	3.88	($0.50)	10	1.00	($0.02)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	3.07	$0.02
Water Heating	Water Heating	EF 2.0	1.19	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.33	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.37	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.40	$0.01	3	2.21	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.61	$0.02	3	3.08	$0.01
Interior Lighting	Screw-in	CFL	1.14	$0.01	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.24	$0.09	20	6.54	$0.01
Interior Lighting	Screw-in	LED (2020)	1.43	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.08	$0.03	15	-	$0.04
Interior Lighting	High-Bay Fixtures	T8	0.08	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.08	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.10	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.10	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.15	$0.01	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	2.69	$5.53	15	1.00	$0.21
Interior Lighting	Linear Fluorescent	T8	2.80	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	3.89	$0.81	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	4.51	$0.62	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	8.40	$1.52	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.10	$0.00	3	2.45	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.15	$0.00	3	3.12	$0.01
Exterior Lighting	Screw-in	CFL	0.29	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.31	$0.06	20	2.74	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.36	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.46	$0.44	15	0.26	$0.10
Exterior Lighting	HID	T8	0.47	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.50	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.59	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.60	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.88	$0.11	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.01	$0.02	15	1.00	$0.21
Exterior Lighting	Linear Fluorescent	T8	0.01	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.02	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.02	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.04	$0.01	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	2.08	$0.04	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	2.33	$0.12	12	9.75	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	2.63	$0.21	12	6.16	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.15	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.20	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.21	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.28	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	2.57	$0.57	12	-	$0.03
Refrigeration	Glass Door Display	8400 kWh/yr	6.36	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	8.03	$0.57	12	1.42	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	1.24	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	1.29	$0.87	12	-	$0.08
Refrigeration	Open Display Case	4330 kWh/yr	2.28	$0.87	12	0.58	$0.05
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.02	$0.04	10	0.23	$0.23
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.03	$0.06	10	0.23	$0.23
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.05	$0.09	10	0.23	$0.23
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.04	$0.02	12	1.28	$0.04
Refrigeration	Vending Machine	2400 kWh/year	0.14	$0.05	12	1.28	$0.04
Refrigeration	Vending Machine	1700 kWh/year	0.18	$0.03	12	2.77	$0.02
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.11	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.07	$0.00	12	9.36	$0.01
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.56	$0.01	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.36	$0.06	12	3.76	$0.02
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.07	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.01	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.05	$0.03	4	0.26	$0.16
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-18 Energy Efficiency Equipment Data, Natural Gas-Grocery, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.03	16	2.36	$0.25
Heating	Furnace	EF .82	0.02	$0.09	16	1.28	$0.46
Heating	Furnace	EF .90	0.04	$0.08	16	3.10	$0.19
Heating	Furnace	EF .96	0.06	$0.12	16	2.87	$0.20
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.02	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.04	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.06	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.03	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	3.14	$0.17
Water Heating	Water Heating	Tankless	0.01	$0.01	12	2.36	$0.23
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	6.16	$0.09
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	6.76	$0.08
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.01	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.04	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-19 Energy Efficiency Equipment Data, Electric-College, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.54	$0.51	20	1.53	$0.08
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.65	$0.57	20	1.63	$0.08
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.35	$0.64	20	3.04	$0.04
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.43	$0.70	20	2.92	$0.04
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.80	$0.28	20	4.06	$0.03
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.91	$0.30	20	4.29	$0.03
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.07	$0.36	20	4.21	$0.03
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.28	$0.57	20	3.25	$0.04
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.33	$0.63	20	3.06	$0.04
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.44	$0.69	20	3.01	$0.04
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.27	$0.03	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.55	$0.04	15	1.00	$0.01
Cooling	Roof top AC	EER 12.0	0.72	$0.12	15	2.20	$0.02
Cooling	Roof top AC	Ductless Minisplit	0.90	$0.40	15	1.06	$0.05
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.25	$0.03	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.40	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.53	$0.13	15	1.24	$0.02
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.58	$0.19	15	1.15	$0.03
Cooling	Air Source Heat Pump	Ductless Minisplit	0.74	$0.32	15	1.25	$0.04
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.07	15	2.31	$0.05
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.26	$0.15	15	2.05	$0.06
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.63	$0.20	15	3.69	$0.03
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.09	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.20	$0.03	15	9.22	$0.01
Cooling	PTAC	EER 11	0.23	$0.03	15	9.85	$0.01
Cooling	PTAC	EER 11.5	0.31	$0.03	15	> 10	$0.01
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.09	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.20	$0.03	15	9.22	$0.01
Cooling	PTHP	EER 11	0.23	$0.03	15	9.85	$0.01
Cooling	PTHP	EER 11.5	0.31	$0.03	15	> 10	$0.01
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.25	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.65	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.15	$0.02	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.30	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.43	$0.06	15	1.22	$0.01
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.43	$0.09	15	0.81	$0.02
Heating	Air Source Heat Pump	Ductless Minisplit	0.56	$0.15	15	0.93	$0.03
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.33	$0.04	15	3.86	$0.01
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.76	$0.09	15	4.33	$0.01
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.97	$0.12	15	8.21	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.02	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.03	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.24	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.56	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11	0.66	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.89	$0.02	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.00	($0.27)	10	1.00	($0.04)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	2.45	$0.03
Water Heating	Water Heating	EF 2.0	0.83	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.94	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.96	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.26	$0.01	3	2.46	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.40	$0.01	3	3.36	$0.01
Interior Lighting	Screw-in	CFL	0.74	$0.00	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	0.81	$0.06	20	7.25	$0.01
Interior Lighting	Screw-in	LED (2020)	0.93	$0.02	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.20	$0.07	15	0.08	$0.03
Interior Lighting	High-Bay Fixtures	T8	0.20	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.21	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.25	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.26	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.38	$0.01	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1.20	$2.28	15	1.00	$0.19
Interior Lighting	Linear Fluorescent	T8	1.25	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.74	$0.33	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	2.01	$0.25	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	3.76	$0.63	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.14	$0.00	3	2.66	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.21	$0.01	3	3.39	$0.01
Exterior Lighting	Screw-in	CFL	0.40	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.43	$0.08	20	2.98	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.50	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.33	$0.29	15	0.28	$0.09
Exterior Lighting	HID	T8	0.34	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.36	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.42	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.43	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.63	$0.08	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.19
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.06	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.05	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.06	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.08	$0.00	12	5.25	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.00	12	-	$0.02
Refrigeration	Open Display Case	4330 kWh/yr	0.02	$0.00	12	2.14	$0.01
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.00	10	0.86	$0.06
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.01	10	0.86	$0.06
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.01	10	0.86	$0.06
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	4.75	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.03	$0.00	12	4.75	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.03	$0.00	12	> 10	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	4.94	$0.01
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	$0.00	12	4.33	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.18	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.03	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.06	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.04	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.04	$0.01	4	0.78	$0.05
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	6.49	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	6.49	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	2.12	$0.03
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	1.24	$0.05
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	$0.00	15	2.70	$0.02
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-20 Energy Efficiency Equipment Data, Natural Gas-College, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.02	$0.04	16	3.00	$0.19
Heating	Furnace	EF .82	0.03	$0.10	16	1.62	$0.36
Heating	Furnace	EF .90	0.06	$0.08	16	3.94	$0.15
Heating	Furnace	EF .96	0.07	$0.12	16	3.64	$0.16
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.03	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.05	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.07	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.10	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.04	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.01	12	2.49	$0.22
Water Heating	Water Heating	Tankless	0.01	$0.03	12	1.86	$0.29
Water Heating	Water Heating	Indirect Fired	0.02	$0.02	12	4.87	$0.11
Water Heating	Water Heating	EF 0.94	0.03	($0.01)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	> 10	$0.03
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.02	$0.00	12	> 10	$0.02
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.06	$0.00	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	$0.00	12	> 10	$0.00
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	0.00	-	5	-	-
Miscellaneous	Pool Heater	EF .95	0.00	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-21 Energy Efficiency Equipment Data, Electric-College, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.48	$0.55	20	1.26	$0.10
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.57	$0.62	20	1.34	$0.09
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.20	$0.69	20	2.50	$0.05
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.27	$0.76	20	2.41	$0.05
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.68	$0.28	20	3.56	$0.04
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.77	$0.30	20	3.77	$0.03
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.91	$0.35	20	3.70	$0.03
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.09	$0.55	20	2.85	$0.04
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.14	$0.61	20	2.68	$0.05
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.23	$0.67	20	2.64	$0.05
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.24	$0.03	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.49	$0.04	15	1.00	$0.01
Cooling	Roof top AC	EER 12.0	0.63	$0.12	15	2.00	$0.02
Cooling	Roof top AC	Ductless Minisplit	0.80	$0.39	15	0.96	$0.05
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.22	$0.03	15	-	$0.02
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.35	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.47	$0.12	15	1.13	$0.03
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.52	$0.19	15	1.04	$0.04
Cooling	Air Source Heat Pump	Ductless Minisplit	0.65	$0.31	15	1.13	$0.05
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.16	$0.09	15	2.10	$0.06
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.29	$0.18	15	1.87	$0.06
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.71	$0.25	15	3.36	$0.04
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.08	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.18	$0.03	15	8.42	$0.01
Cooling	PTAC	EER 11	0.21	$0.03	15	9.00	$0.01
Cooling	PTAC	EER 11.5	0.28	$0.03	15	9.98	$0.01
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.08	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.18	$0.03	15	8.42	$0.01
Cooling	PTHP	EER 11	0.21	$0.03	15	9.00	$0.01
Cooling	PTHP	EER 11.5	0.28	$0.03	15	9.98	$0.01
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.25	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.65	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.15	$0.02	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.29	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.42	$0.08	15	0.88	$0.02
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.42	$0.12	15	0.59	$0.03
Heating	Air Source Heat Pump	Ductless Minisplit	0.54	$0.20	15	0.67	$0.04
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.32	$0.06	15	2.81	$0.02
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.75	$0.12	15	3.15	$0.02
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.93	$0.17	15	5.98	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.02	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.03	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.23	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.54	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11	0.64	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.86	$0.02	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.77	($0.47)	10	1.00	($0.04)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	2.55	$0.02
Water Heating	Water Heating	EF 2.0	0.79	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.89	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.92	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.26	$0.01	3	2.46	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.40	$0.01	3	3.36	$0.01
Interior Lighting	Screw-in	CFL	0.74	$0.00	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	0.81	$0.06	20	7.25	$0.01
Interior Lighting	Screw-in	LED (2020)	0.93	$0.02	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.20	$0.07	15	0.08	$0.03
Interior Lighting	High-Bay Fixtures	T8	0.20	($0.00)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.21	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.25	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.26	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.38	$0.01	15	-	$0.00
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1.20	$2.28	15	1.00	$0.19
Interior Lighting	Linear Fluorescent	T8	1.25	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.74	$0.33	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	T5	2.01	$0.25	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	3.76	$0.63	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.14	$0.00	3	2.66	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.21	$0.01	3	3.39	$0.01
Exterior Lighting	Screw-in	CFL	0.40	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.43	$0.08	20	2.98	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.50	$0.02	20	-	$0.00
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.33	$0.29	15	0.28	$0.09
Exterior Lighting	HID	T8	0.34	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.36	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.42	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.43	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.63	$0.08	15	-	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.19
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.02
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.06	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.05	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.06	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.08	$0.00	12	5.25	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.00	12	-	$0.02
Refrigeration	Open Display Case	4330 kWh/yr	0.02	$0.00	12	2.14	$0.01
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.00	10	0.86	$0.06
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.01	10	0.86	$0.06
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.01	10	0.86	$0.06
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	4.78	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.03	$0.00	12	4.78	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.04	$0.00	12	> 10	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	4.94	$0.01
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	$0.00	12	4.33	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.18	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.03	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.06	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.04	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.04	$0.01	4	0.78	$0.05
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	6.49	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	6.49	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	2.12	$0.03
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	1.24	$0.05
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	$0.00	15	2.70	$0.02
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-22 Energy Efficiency Equipment Data, Natural Gas-College, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.02	$0.03	16	3.06	$0.19
Heating	Furnace	EF .82	0.03	$0.09	16	1.66	$0.35
Heating	Furnace	EF .90	0.06	$0.08	16	4.03	$0.14
Heating	Furnace	EF .96	0.08	$0.12	16	3.72	$0.16
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.02	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.04	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.06	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.08	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.04	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.01	12	2.59	$0.21
Water Heating	Water Heating	Tankless	0.01	$0.03	12	1.94	$0.28
Water Heating	Water Heating	Indirect Fired	0.02	$0.02	12	5.07	$0.11
Water Heating	Water Heating	EF 0.94	0.03	($0.01)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	> 10	$0.03
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.02	$0.00	12	> 10	$0.02
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.06	$0.00	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	$0.00	12	> 10	$0.00
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	0.00	-	5	-	-
Miscellaneous	Pool Heater	EF .95	0.00	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-23 Energy Efficiency Equipment Data, Electric-School Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.41	$0.39	20	2.54	$0.08
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.50	$0.44	20	2.70	$0.08
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.03	$0.49	20	5.05	$0.04
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.09	$0.54	20	4.85	$0.04
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.61	$0.22	20	6.73	$0.03
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.69	$0.23	20	7.12	$0.03
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.82	$0.28	20	6.99	$0.03
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.98	$0.43	20	5.39	$0.04
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.02	$0.48	20	5.07	$0.04
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.10	$0.53	20	5.00	$0.04
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.21	$0.03	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.42	$0.03	15	1.00	$0.01
Cooling	Roof top AC	EER 12.0	0.55	$0.09	15	3.65	$0.02
Cooling	Roof top AC	Ductless Minisplit	0.69	$0.31	15	1.75	$0.05
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.19	$0.03	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.31	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.41	$0.10	15	2.05	$0.02
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.45	$0.15	15	1.90	$0.03
Cooling	Air Source Heat Pump	Ductless Minisplit	0.56	$0.25	15	2.06	$0.04
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.11	$0.05	15	3.83	$0.05
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.20	$0.11	15	3.40	$0.06
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.48	$0.15	15	6.11	$0.03
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.16	$0.02	15	> 10	$0.01
Cooling	PTAC	EER 11	0.18	$0.02	15	> 10	$0.01
Cooling	PTAC	EER 11.5	0.24	$0.03	15	> 10	$0.01
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.16	$0.02	15	> 10	$0.01
Cooling	PTHP	EER 11	0.18	$0.02	15	> 10	$0.01
Cooling	PTHP	EER 11.5	0.24	$0.03	15	> 10	$0.01
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.19	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.50	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.09	$0.01	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.17	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.25	$0.03	15	1.22	$0.01
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.25	$0.05	15	0.81	$0.02
Heating	Air Source Heat Pump	Ductless Minisplit	0.32	$0.09	15	0.93	$0.03
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.19	$0.03	15	3.86	$0.01
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.44	$0.05	15	4.33	$0.01
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.13	$0.07	15	8.21	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.01	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.14	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.32	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.38	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.51	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.63	($0.17)	10	1.00	($0.04)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	2.22	$0.03
Water Heating	Water Heating	EF 2.0	0.54	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.61	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.63	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.05	$0.00	3	1.06	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.08	$0.00	3	1.40	$0.02
Interior Lighting	Screw-in	CFL	0.15	$0.00	2.2	6.49	$0.01
Interior Lighting	Screw-in	LED (2010)	0.16	$0.03	20	3.10	$0.01
Interior Lighting	Screw-in	LED (2020)	0.19	$0.01	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.12	$0.09	15	0.27	$0.08
Interior Lighting	High-Bay Fixtures	T8	0.12	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.13	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.15	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.23	$0.02	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.99	$4.52	15	1.00	$0.47
Interior Lighting	Linear Fluorescent	T8	1.03	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.43	$0.66	10	1.00	$0.06
Interior Lighting	Linear Fluorescent	T5	1.66	$0.50	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	3.10	$1.24	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.05	$0.00	3	1.10	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.07	$0.00	3	1.41	$0.02
Exterior Lighting	Screw-in	CFL	0.14	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.15	$0.06	20	1.24	$0.04
Exterior Lighting	Screw-in	LED (2020)	0.17	$0.02	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.30	$0.64	15	0.12	$0.22
Exterior Lighting	HID	T8	0.31	($0.02)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.33	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.38	$0.02	15	1.00	$0.00
Exterior Lighting	HID	T5	0.39	$0.02	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.58	$0.17	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.47
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.06
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	$0.00	12	8.17	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.08	$0.01	12	5.16	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.04	$0.00	12	8.87	$0.01
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.04	$0.00	12	7.97	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.06	$0.00	12	9.51	$0.01
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	$0.00	12	2.12	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.01	12	-	$0.05
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.87	$0.03
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.35	$0.15
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	$0.02	10	0.35	$0.15
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.03	10	0.35	$0.15
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	1.92	$0.03
Refrigeration	Vending Machine	2400 kWh/year	0.03	$0.01	12	1.92	$0.03
Refrigeration	Vending Machine	1700 kWh/year	0.04	$0.00	12	4.15	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.02	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.11	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.07	$0.00	12	7.37	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.08	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.04	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	St1.14	1.14	$0.03
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-24 Energy Efficiency Equipment Data, Natural Gas-School, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.02	16	3.00	$0.19
Heating	Furnace	EF .82	0.01	$0.04	16	1.62	$0.36
Heating	Furnace	EF .90	0.03	$0.04	16	3.94	$0.15
Heating	Furnace	EF .96	0.03	$0.05	16	3.64	$0.16
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.04	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.01
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	2.49	$0.22
Water Heating	Water Heating	Tankless	0.01	$0.02	12	1.86	$0.29
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	4.87	$0.11
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.04
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.01	$0.00	12	> 10	$0.04
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.02	$0.00	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.00	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.04
Miscellaneous	Pool Heater	EF .90	0.00	$0.00	5	1.35	$0.23
Miscellaneous	Pool Heater	EF .95	0.00	$0.00	5	1.81	$0.19
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-25 Energy Efficiency Equipment Data, Electric-School, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.37	$0.42	20	2.10	$0.10
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.44	$0.47	20	2.23	$0.09
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.92	$0.53	20	4.16	$0.05
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.97	$0.58	20	3.99	$0.05
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.52	$0.21	20	5.91	$0.04
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.59	$0.23	20	6.26	$0.03
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.70	$0.27	20	6.14	$0.03
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.84	$0.42	20	4.73	$0.04
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.87	$0.47	20	4.46	$0.05
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.94	$0.51	20	4.39	$0.05
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.19	$0.02	15	-	$0.01
Cooling	Roof top AC	EER 11.2	0.37	$0.03	15	1.00	$0.01
Cooling	Roof top AC	EER 12.0	0.49	$0.09	15	3.32	$0.02
Cooling	Roof top AC	Ductless Minisplit	0.61	$0.30	15	1.60	$0.05
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.17	$0.03	15	-	$0.02
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.27	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.36	$0.10	15	1.86	$0.03
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.40	$0.14	15	1.73	$0.04
Cooling	Air Source Heat Pump	Ductless Minisplit	0.50	$0.24	15	1.88	$0.05
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.12	$0.07	15	3.49	$0.06
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.22	$0.14	15	3.10	$0.06
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.54	$0.19	15	5.56	$0.04
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.14	$0.02	15	> 10	$0.01
Cooling	PTAC	EER 11	0.16	$0.02	15	> 10	$0.01
Cooling	PTAC	EER 11.5	0.21	$0.02	15	> 10	$0.01
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.14	$0.02	15	> 10	$0.01
Cooling	PTHP	EER 11	0.16	$0.02	15	> 10	$0.01
Cooling	PTHP	EER 11.5	0.21	$0.02	15	> 10	$0.01
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.19	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.50	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.09	$0.01	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.17	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.24	$0.05	15	0.88	$0.02
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.24	$0.07	15	0.59	$0.03
Heating	Air Source Heat Pump	Ductless Minisplit	0.31	$0.11	15	0.67	$0.04
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.19	$0.03	15	2.81	$0.02
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.43	$0.07	15	3.15	$0.02
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.11	$0.10	15	5.98	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.01	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.13	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.31	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.37	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.50	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	1.13	($0.30)	10	1.00	($0.04)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	2.31	$0.02
Water Heating	Water Heating	EF 2.0	0.51	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.58	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.59	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.05	$0.00	3	1.06	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.08	$0.00	3	1.40	$0.02
Interior Lighting	Screw-in	CFL	0.15	$0.00	2.2	6.49	$0.01
Interior Lighting	Screw-in	LED (2010)	0.16	$0.03	20	3.10	$0.01
Interior Lighting	Screw-in	LED (2020)	0.19	$0.01	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.12	$0.09	15	0.27	$0.08
Interior Lighting	High-Bay Fixtures	T8	0.12	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.13	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.15	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.15	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.23	$0.02	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.99	$4.52	15	1.00	$0.47
Interior Lighting	Linear Fluorescent	T8	1.03	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.43	$0.66	10	1.00	$0.06
Interior Lighting	Linear Fluorescent	T5	1.66	$0.50	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	3.10	$1.24	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.05	$0.00	3	1.10	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.07	$0.00	3	1.41	$0.02
Exterior Lighting	Screw-in	CFL	0.14	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.15	$0.06	20	1.24	$0.04
Exterior Lighting	Screw-in	LED (2020)	0.17	$0.02	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.30	$0.64	15	0.12	$0.22
Exterior Lighting	HID	T8	0.31	($0.02)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.33	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.38	$0.02	15	1.00	$0.00
Exterior Lighting	HID	T5	0.39	$0.02	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.58	$0.17	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.47
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.06
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.07	$0.00	12	8.17	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.08	$0.01	12	5.16	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.04	$0.00	12	8.87	$0.01
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.04	$0.00	12	7.97	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.06	$0.00	12	9.51	$0.01
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.07	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	$0.00	12	2.12	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.01	$0.01	12	-	$0.05
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.87	$0.03
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.35	$0.15
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	$0.02	10	0.35	$0.15
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.03	10	0.35	$0.15
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	1.92	$0.03
Refrigeration	Vending Machine	2400 kWh/year	0.03	$0.01	12	1.92	$0.03
Refrigeration	Vending Machine	1700 kWh/year	0.04	$0.00	12	4.15	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.02	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.11	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.07	$0.00	12	7.37	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.08	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.04	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	4	1.14	$0.03
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	> 10	$0.00
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-26 Energy Efficiency Equipment Data, Natural Gas-School, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	duct Ev-	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.02	16	3.06	$0.19
Heating	Furnace	EF .82	0.01	$0.04	16	1.66	$0.35
Heating	Furnace	EF .90	0.03	$0.04	16	4.03	$0.14
Heating	Furnace	EF .96	0.03	$0.05	16	3.72	$0.16
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.04	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.01
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.01	12	2.59	$0.21
Water Heating	Water Heating	Tankless	0.01	$0.01	12	1.94	$0.28
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	5.07	$0.11
Water Heating	Water Heating	EF 0.94	0.02	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.04
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.01	$0.00	12	> 10	$0.04
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.02	$0.00	12	> 10	$0.01
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.00	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.04
Miscellaneous	Pool Heater	EF .90	0.00	$0.00	5	1.35	$0.23
Miscellaneous	Pool Heater	EF .95	0.00	$0.00	5	1.81	$0.19
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-27 Energy Efficiency Equipment Data, Electric-Health, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.66	$0.57	20	1.11	$0.08
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.79	$0.65	20	1.17	$0.07
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.64	$0.72	20	2.20	$0.04
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.74	$0.80	20	2.11	$0.04
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.75	$0.22	20	3.32	$0.03
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.85	$0.23	20	3.51	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1.00	$0.28	20	3.45	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.20	$0.44	20	2.66	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.25	$0.48	20	2.50	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.35	$0.53	20	2.46	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.54	$0.03	15	-	$0.01
Cooling	Roof top AC	EER 11.2	1.08	$0.03	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	1.41	$0.11	15	3.36	$0.01
Cooling	Roof top AC	Ductless Minisplit	1.77	$0.35	15	1.62	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.60	$0.04	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.96	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.27	$0.14	15	1.89	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.40	$0.20	15	1.75	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	1.77	$0.34	15	1.90	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.34	$0.07	15	3.53	$0.02
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.61	$0.15	15	3.13	$0.03
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1.50	$0.21	15	5.63	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.17	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.40	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.46	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.61	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.17	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.40	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.46	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.61	$0.02	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.50	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.28	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.08	$0.01	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.15	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.21	$0.02	15	1.72	$0.01
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.21	$0.03	15	1.15	$0.01
Heating	Air Source Heat Pump	Ductless Minisplit	0.28	$0.05	15	1.31	$0.02
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.17	$0.02	15	5.75	$0.01
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.40	$0.03	15	6.45	$0.01
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.03	$0.04	15	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.02	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.02	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.12	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.28	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.34	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.45	$0.02	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	2.04	($0.14)	10	1.00	($0.01)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	4.29	$0.01
Water Heating	Water Heating	EF 2.0	1.10	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.23	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.27	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.38	$0.01	3	1.70	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.59	$0.02	3	2.28	$0.01
Interior Lighting	Screw-in	CFL	1.11	$0.01	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.20	$0.12	20	4.99	$0.01
Interior Lighting	Screw-in	LED (2020)	1.38	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.17	$0.08	15	0.26	$0.05
Interior Lighting	High-Bay Fixtures	T8	0.17	($0.01)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.18	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.21	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.22	$0.01	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.32	$0.02	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.94	$2.63	15	1.00	$0.29
Interior Lighting	Linear Fluorescent	T8	0.98	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.36	$0.38	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1.58	$0.29	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.94	$0.72	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.01	$0.00	3	1.80	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.01	$0.00	3	2.29	$0.01
Exterior Lighting	Screw-in	CFL	0.03	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.03	$0.01	20	2.01	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.03	$0.00	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.17	$0.23	15	0.19	$0.14
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.19	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.22	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.33	$0.06	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.29
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.09	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.01	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	$0.01	12	1.60	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.01	12	-	$0.07
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.65	$0.04
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.26	$0.20
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	$0.02	10	0.26	$0.20
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.04	10	0.26	$0.20
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	1.55	$0.04
Refrigeration	Vending Machine	2400 kWh/year	0.03	$0.01	12	1.55	$0.04
Refrigeration	Vending Machine	1700 kWh/year	0.05	$0.01	12	3.35	$0.02
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.07	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.36	$0.01	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.23	$0.01	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.13	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.05	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.04	$0.02	4	0.28	$0.14
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.01	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.01	$0.00	15	7.43	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.02	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.02	$0.00	15	7.43	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.03	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.01	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-28 Energy Efficiency Equipment Data, Natural Gas-Health, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.03	$0.04	16	4.39	$0.13
Heating	Furnace	EF .82	0.04	$0.10	16	2.37	$0.25
Heating	Furnace	EF .90	0.08	$0.09	16	5.78	$0.10
Heating	Furnace	EF .96	0.11	$0.12	16	5.33	$0.11
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.05	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.08	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.12	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.17	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.06	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.02	$0.02	12	5.06	$0.11
Water Heating	Water Heating	Tankless	0.03	$0.03	12	3.80	$0.14
Water Heating	Water Heating	Indirect Fired	0.05	$0.02	12	9.91	$0.05
Water Heating	Water Heating	EF 0.94	0.08	($0.01)	12	1.00	($0.01)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.08	$0.04	12	8.47	$0.06
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.07	$0.00	12	> 10	$0.01
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.01	$0.00	12	> 10	$0.00
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.04	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.19	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.02	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.01	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	0.03	-	5	-	-
Miscellaneous	Pool Heater	EF .95	0.04	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-29 Energy Efficiency Equipment Data, Electric-Health, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.58	$0.50	20	1.11	$0.08
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.69	$0.57	20	1.18	$0.07
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1.44	$0.63	20	2.21	$0.04
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1.53	$0.70	20	2.12	$0.04
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.72	$0.21	20	3.29	$0.03
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.81	$0.23	20	3.48	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.96	$0.27	20	3.41	$0.03
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1.15	$0.42	20	2.63	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1.20	$0.47	20	2.47	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1.30	$0.51	20	2.44	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.47	$0.02	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.94	$0.02	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	1.23	$0.06	15	4.99	$0.01
Cooling	Roof top AC	Ductless Minisplit	1.55	$0.21	15	2.40	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.60	$0.02	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.96	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1.27	$0.09	15	2.80	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1.40	$0.14	15	2.60	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	1.77	$0.23	15	2.82	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.34	$0.05	15	5.24	$0.02
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.61	$0.10	15	4.66	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1.50	$0.14	15	8.36	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.16	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.37	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11	0.42	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.56	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.16	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.37	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11	0.42	$0.02	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.56	$0.02	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.50	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	1.28	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.05	$0.01	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.09	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.14	$0.02	15	1.12	$0.02
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.14	$0.03	15	0.75	$0.02
Heating	Air Source Heat Pump	Ductless Minisplit	0.19	$0.06	15	0.88	$0.03
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.16	$0.01	15	8.58	$0.01
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.37	$0.02	15	9.63	$0.01
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.97	$0.03	15	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.01	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.11	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.26	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.30	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.41	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	3.17	($0.22)	10	1.00	($0.01)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.00	15	4.51	$0.01
Water Heating	Water Heating	EF 2.0	1.04	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.17	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.21	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.38	$0.01	3	1.70	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	0.59	$0.02	3	2.28	$0.01
Interior Lighting	Screw-in	CFL	1.11	$0.01	2.2	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	1.20	$0.12	20	4.99	$0.01
Interior Lighting	Screw-in	LED (2020)	1.38	$0.03	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.17	$0.08	15	0.26	$0.05
Interior Lighting	High-Bay Fixtures	T8	0.17	($0.01)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.18	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.21	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.22	$0.01	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.32	$0.02	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.94	$2.63	15	1.00	$0.29
Interior Lighting	Linear Fluorescent	T8	0.98	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.36	$0.38	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1.58	$0.29	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	2.94	$0.72	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.01	$0.00	3	1.80	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.01	$0.00	3	2.29	$0.01
Exterior Lighting	Screw-in	CFL	0.03	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.03	$0.01	20	2.01	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.03	$0.00	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.17	$0.23	15	0.19	$0.14
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	0.19	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.22	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.33	$0.06	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.29
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.07	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.09	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.01	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.09	$0.01	12	1.60	$0.01
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.01	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.01	12	-	$0.07
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.65	$0.04
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.26	$0.20
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.02	$0.02	10	0.26	$0.20
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.02	$0.04	10	0.26	$0.20
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	1.03	$0.05
Refrigeration	Vending Machine	2400 kWh/year	0.02	$0.01	12	1.03	$0.05
Refrigeration	Vending Machine	1700 kWh/year	0.03	$0.01	12	2.23	$0.03
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.07	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.36	$0.01	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.23	$0.01	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.13	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.05	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.04	$0.02	4	0.28	$0.14
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.01	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.01	$0.00	15	7.43	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.02	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.02	$0.00	15	7.43	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.03	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.01	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-30 Energy Efficiency Equipment Data, Natural Gas-Health, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.02	$0.03	16	3.85	$0.15
Heating	Furnace	EF .82	0.03	$0.09	16	2.08	$0.28
Heating	Furnace	EF .90	0.06	$0.08	16	5.07	$0.12
Heating	Furnace	EF .96	0.09	$0.11	16	4.67	$0.12
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.02	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.05	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.07	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.06	-	15	-	-
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.02	$0.02	12	4.67	$0.12
Water Heating	Water Heating	Tankless	0.03	$0.03	12	3.50	$0.15
Water Heating	Water Heating	Indirect Fired	0.05	$0.02	12	9.18	$0.06
Water Heating	Water Heating	EF 0.94	0.08	($0.01)	12	1.00	($0.01)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.08	$0.04	12	8.47	$0.06
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.07	$0.00	12	> 10	$0.01
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.01	$0.00	12	> 10	$0.00
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.04	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.19	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.02	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.01	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	0.03	-	5	-	-
Miscellaneous	Pool Heater	EF .95	0.04	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-31 Energy Efficiency Equipment Data, Electric-Lodging, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.11	$0.07	20	1.80	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.13	$0.07	20	1.92	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.27	$0.08	20	3.58	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.28	$0.09	20	3.44	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.13	$0.03	20	4.58	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.15	$0.03	20	4.84	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.18	$0.04	20	4.75	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.21	$0.06	20	3.66	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.22	$0.07	20	3.45	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.24	$0.08	20	3.40	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.07	$0.00	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.14	$0.00	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.18	$0.01	15	4.66	$0.01
Cooling	Roof top AC	Ductless Minisplit	0.22	$0.04	15	2.24	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.07	$0.00	15	-	$0.01
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.12	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.15	$0.01	15	2.61	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.17	$0.02	15	2.43	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.21	$0.03	15	2.63	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.15	$0.01	15	> 10	$0.00
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.28	$0.01	15	> 10	$0.00
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.69	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.16	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.18	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.24	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.16	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.18	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.24	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.20	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.50	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.02	$0.00	15	-	$0.01
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.04	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.06	$0.01	15	1.27	$0.01
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.06	$0.01	15	0.84	$0.02
Heating	Air Source Heat Pump	Ductless Minisplit	0.08	$0.02	15	0.96	$0.03
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.09	$0.00	15	> 10	$0.00
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.20	$0.00	15	> 10	$0.00
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.53	$0.01	15	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.01	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.06	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.14	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.16	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.22	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.40	($0.06)	10	1.00	($0.02)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.01	15	1.56	$0.04
Water Heating	Water Heating	EF 2.0	1.11	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.25	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.29	$0.02	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	1.19	$0.06	3	1.37	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	1.82	$0.08	3	1.81	$0.02
Interior Lighting	Screw-in	CFL	3.41	$0.03	2.2	8.44	$0.00
Interior Lighting	Screw-in	LED (2010)	3.70	$0.48	20	4.01	$0.01
Interior Lighting	Screw-in	LED (2020)	4.27	$0.13	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.05	$0.03	15	0.32	$0.06
Interior Lighting	High-Bay Fixtures	T8	0.05	($0.00)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.06	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.07	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.07	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.10	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.24	$0.83	15	1.00	$0.36
Interior Lighting	Linear Fluorescent	T8	0.25	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	0.34	$0.12	10	1.00	$0.05
Interior Lighting	Linear Fluorescent	T5	0.40	$0.09	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	LED (2020)	0.74	$0.23	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.11	$0.01	3	1.43	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.17	$0.01	3	1.82	$0.02
Exterior Lighting	Screw-in	CFL	0.31	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.34	$0.11	20	1.60	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.39	$0.03	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.11	$0.18	15	0.15	$0.17
Exterior Lighting	HID	T8	0.11	($0.00)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.14	$0.00	15	1.00	$0.00
Exterior Lighting	HID	T5	0.15	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.21	$0.05	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.36
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.05
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.09	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.10	$0.01	12	7.59	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.09	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.11	$0.00	12	2.35	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.02	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.01	12	-	$0.05
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.96	$0.03
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	2.03	$0.03
Refrigeration	Vending Machine	2400 kWh/year	0.04	$0.01	12	2.03	$0.03
Refrigeration	Vending Machine	1700 kWh/year	0.05	$0.00	12	4.39	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.02	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.01	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.00	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.00	$0.00	4	0.33	$0.12
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	5.88	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	5.88	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	3.49	$0.02
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	2.05	$0.03
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-32 Energy Efficiency Equipment Data, Natural Gas-Lodging, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.01	16	6.59	$0.09
Heating	Furnace	EF .82	0.01	$0.02	16	3.56	$0.16
Heating	Furnace	EF .90	0.03	$0.02	16	8.68	$0.07
Heating	Furnace	EF .96	0.04	$0.03	16	8.00	$0.07
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.05	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.03	12	1.70	$0.32
Water Heating	Water Heating	Tankless	0.02	$0.06	12	1.28	$0.42
Water Heating	Water Heating	Indirect Fired	0.03	$0.04	12	3.34	$0.16
Water Heating	Water Heating	EF 0.94	0.05	($0.01)	12	1.00	($0.03)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	> 10	$0.03
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.02	$0.00	12	> 10	$0.01
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.06	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.18
Miscellaneous	Pool Heater	EF .90	0.00	$0.01	5	0.26	$1.17
Miscellaneous	Pool Heater	EF .95	0.00	$0.01	5	0.35	$0.99
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-33 Energy Efficiency Equipment Data, Electric-Lodging, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.10	$0.06	20	1.86	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.12	$0.07	20	1.97	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.25	$0.07	20	3.69	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.26	$0.08	20	3.54	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.12	$0.03	20	4.69	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.14	$0.03	20	4.96	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.17	$0.04	20	4.86	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.20	$0.06	20	3.75	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.21	$0.06	20	3.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.22	$0.07	20	3.48	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.07	$0.00	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.14	$0.00	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.18	$0.01	15	4.90	$0.01
Cooling	Roof top AC	Ductless Minisplit	0.23	$0.04	15	2.36	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.07	$0.00	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.12	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.16	$0.01	15	2.75	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.17	$0.02	15	2.55	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.22	$0.03	15	2.77	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.01	15	> 10	$0.00
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.26	$0.01	15	> 10	$0.00
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.65	$0.02	15	> 10	$0.00
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.14	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.17	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.22	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.14	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.17	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.22	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.20	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.50	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.02	$0.00	15	-	$0.02
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.04	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.06	$0.01	15	0.85	$0.02
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.06	$0.02	15	0.56	$0.03
Heating	Air Source Heat Pump	Ductless Minisplit	0.07	$0.03	15	0.64	$0.04
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.08	$0.00	15	> 10	$0.00
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.19	$0.01	15	> 10	$0.00
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.50	$0.01	15	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.00	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.00	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.05	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.12	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11	0.15	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.20	$0.00	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.29	($0.11)	10	1.00	($0.05)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.02	$0.01	15	1.56	$0.04
Water Heating	Water Heating	EF 2.0	1.06	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	1.19	$0.02	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	1.22	$0.02	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	1.19	$0.06	3	1.37	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	1.82	$0.08	3	1.81	$0.02
Interior Lighting	Screw-in	CFL	3.41	$0.03	2.2	8.44	$0.00
Interior Lighting	Screw-in	LED (2010)	3.70	$0.48	20	4.01	$0.01
Interior Lighting	Screw-in	LED (2020)	4.27	$0.13	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.05	$0.03	15	0.32	$0.06
Interior Lighting	High-Bay Fixtures	T8	0.05	($0.00)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.06	$0.00	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.07	$0.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.07	$0.00	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	0.10	$0.01	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.24	$0.83	15	1.00	$0.36
Interior Lighting	Linear Fluorescent	T8	0.25	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	0.34	$0.12	10	1.00	$0.05
Interior Lighting	Linear Fluorescent	T5	0.40	$0.09	10	1.00	$0.03
Interior Lighting	Linear Fluorescent	LED (2020)	0.74	$0.23	15	-	$0.03
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.11	$0.01	3	1.43	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.17	$0.01	3	1.82	$0.02
Exterior Lighting	Screw-in	CFL	0.31	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.34	$0.11	20	1.60	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.39	$0.03	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.11	$0.18	15	0.15	$0.17
Exterior Lighting	HID	T8	0.11	($0.00)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.12	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.14	$0.00	15	1.00	$0.00
Exterior Lighting	HID	T5	0.15	$0.01	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	0.21	$0.05	15	-	$0.02

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.36
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.05
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.03
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.03
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.09	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.10	$0.01	12	7.59	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.02
Refrigeration	Glass Door Display	8400 kWh/yr	0.09	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.11	$0.00	12	2.35	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.02	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.01	12	-	$0.05
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.01	12	0.96	$0.03
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	0.39	$0.14
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.02	$0.00	12	3.18	$0.02
Refrigeration	Vending Machine	2400 kWh/year	0.06	$0.01	12	3.18	$0.02
Refrigeration	Vending Machine	1700 kWh/year	0.07	$0.00	12	6.88	$0.01
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.04	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.02	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.01	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.00	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.00	$0.00	4	0.33	$0.12
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	5.88	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	5.88	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	3.49	$0.02
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	2.05	$0.03
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.01	$0.00	15	> 10	$0.00
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-34 Energy Efficiency Equipment Data, Natural Gas-Lodging, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.00	16	8.88	$0.07
Heating	Furnace	EF .82	0.01	$0.01	16	4.81	$0.12
Heating	Furnace	EF .90	0.02	$0.01	16	> 10	$0.05
Heating	Furnace	EF .96	0.03	$0.01	16	> 10	$0.05
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.04	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.01	$0.02	12	1.71	$0.32
Water Heating	Water Heating	Tankless	0.01	$0.05	12	1.28	$0.42
Water Heating	Water Heating	Indirect Fired	0.03	$0.04	12	3.35	$0.16
Water Heating	Water Heating	EF 0.94	0.04	($0.01)	12	1.00	($0.03)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.02	$0.01	12	> 10	$0.03
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.02	$0.00	12	> 10	$0.01
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.01	$0.00	12	> 10	$0.00
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.06	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.01	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.18
Miscellaneous	Pool Heater	EF .90	0.00	$0.01	5	0.26	$1.17
Miscellaneous	Pool Heater	EF .95	0.00	$0.01	5	0.35	$0.99
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-35 Energy Efficiency Equipment Data, Electric-Warehouse, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.22	$0.09	20	7.60	$0.04
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.27	$0.10	20	8.07	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.56	$0.11	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.59	$0.13	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.34	$0.05	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.39	$0.06	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.46	$0.07	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.55	$0.11	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.57	$0.12	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.62	$0.13	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.25	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.51	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.66	$0.03	15	> 10	$0.00
Cooling	Roof top AC	Ductless Minisplit	0.83	$0.09	15	8.98	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.28	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.44	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.58	$0.04	15	> 10	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.64	$0.05	15	9.73	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.81	$0.09	15	> 10	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.15	$0.02	15	> 10	$0.01
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.28	$0.04	15	> 10	$0.01
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.69	$0.05	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.08	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.19	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.22	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.29	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.08	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.19	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.22	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.29	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.24	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.60	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.00	$0.12	15	-	$2.82
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.01	$0.01	15	1.00	$0.21
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.01	$0.43	15	0.00	$5.12
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.01	$0.63	15	0.00	$7.59
Heating	Air Source Heat Pump	Ductless Minisplit	0.01	$1.07	15	0.00	$12.39
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.18	$0.22	15	0.42	$0.13
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.41	$0.45	15	0.47	$0.11
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1.06	$0.61	15	0.90	$0.06

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.02	15	-	-
Heating	PTAC	EER 11	-	$0.02	15	-	-
Heating	PTAC	EER 11.5	-	$0.02	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.13	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.30	$0.02	15	9.98	$0.01
Heating	PTHP	EER 11	0.35	$0.02	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.47	$0.02	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.17	($0.06)	10	1.00	($0.05)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.00	$0.00	15	3.09	$0.02
Water Heating	Water Heating	EF 2.0	0.11	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.13	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.13	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.11	$0.01	3	1.15	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.17	$0.01	3	1.60	$0.02
Interior Lighting	Screw-in	CFL	0.32	$0.00	2.2	7.72	$0.00
Interior Lighting	Screw-in	LED (2010)	0.35	$0.05	20	3.39	$0.01
Interior Lighting	Screw-in	LED (2020)	0.40	$0.01	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.27	$0.19	15	-	$0.07
Interior Lighting	High-Bay Fixtures	T8	0.27	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.29	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.34	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.35	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.52	$0.04	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.36	$1.43	15	1.00	$0.41
Interior Lighting	Linear Fluorescent	T8	0.37	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	0.52	$0.21	10	1.00	$0.05
Interior Lighting	Linear Fluorescent	T5	0.60	$0.16	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	1.12	$0.39	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.00	$0.00	3	1.27	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.00	$0.00	3	1.61	$0.02
Exterior Lighting	Screw-in	CFL	0.00	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.00	$0.00	20	1.42	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.00	$0.00	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.18	$0.33	15	0.14	$0.19
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.19	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.23	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.34	$0.09	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.41
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.05
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.37	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.41	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.46	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	8400 kWh/yr	-	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	-	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	4330 kWh/yr	-	-	12	-	-
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.10	$0.03	10	1.28	$0.04
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.17	$0.05	10	1.28	$0.04
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.25	$0.08	10	1.28	$0.04
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.10	$0.01	12	6.90	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.33	$0.02	12	6.90	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.43	$0.01	12	> 10	$0.00
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.00	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.00	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	-	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.04	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.00	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	4	7.87	$0.01
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-36 Energy Efficiency Equipment Data, Natural Gas-Warehouse, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.19	16	0.25	$2.33
Heating	Furnace	EF .82	0.01	$0.53	16	0.14	$4.30
Heating	Furnace	EF .90	0.03	$0.46	16	0.33	$1.77
Heating	Furnace	EF .96	0.03	$0.67	16	0.30	$1.92
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.10	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.17	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.26	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.37	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.01	15	9.09	$0.06
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.00	12	3.18	$0.17
Water Heating	Water Heating	Tankless	0.00	$0.00	12	2.39	$0.23
Water Heating	Water Heating	Indirect Fired	0.00	$0.00	12	6.26	$0.09
Water Heating	Water Heating	EF 0.94	0.01	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	-	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	-	-	12	-	-
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	-	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	-	-	12	-	-
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	-	-	12	-	-
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	-	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	-	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-37 Energy Efficiency Equipment Data, Electric-Warehouse, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.23	$0.13	20	5.18	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.27	$0.15	20	5.50	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.57	$0.17	20	> 10	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.60	$0.19	20	9.87	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.22	$0.05	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.24	$0.05	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.29	$0.07	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.35	$0.10	20	> 10	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.36	$0.11	20	9.80	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.39	$0.12	20	9.65	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.19	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.38	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.50	$0.02	15	> 10	$0.00
Cooling	Roof top AC	Ductless Minisplit	0.63	$0.08	15	8.02	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.23	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.37	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.49	$0.03	15	9.36	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.53	$0.05	15	8.69	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.68	$0.08	15	9.43	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.02	15	> 10	$0.01
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.26	$0.04	15	> 10	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.62	$0.06	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.17	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.20	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.26	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.17	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.20	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.26	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.24	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.60	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.04	$0.06	15	-	$0.17
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.07	$0.01	15	1.00	$0.01
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.11	$0.23	15	0.09	$0.21
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.11	$0.33	15	0.06	$0.31
Heating	Air Source Heat Pump	Ductless Minisplit	0.15	$0.56	15	0.07	$0.39
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.16	$0.10	15	0.79	$0.07
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.36	$0.21	15	0.89	$0.06
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.94	$0.29	15	1.69	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.01	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.11	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.27	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11	0.31	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.43	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.02	($0.11)	10	1.00	($0.74)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.00	$0.00	15	3.19	$0.02
Water Heating	Water Heating	EF 2.0	0.11	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.12	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.13	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.11	$0.01	3	1.15	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.17	$0.01	3	1.60	$0.02
Interior Lighting	Screw-in	CFL	0.32	$0.00	2.2	7.72	$0.00
Interior Lighting	Screw-in	LED (2010)	0.35	$0.05	20	3.39	$0.01
Interior Lighting	Screw-in	LED (2020)	0.40	$0.01	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.27	$0.19	15	-	$0.07
Interior Lighting	High-Bay Fixtures	T8	0.27	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.29	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.34	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.35	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.52	$0.04	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.36	$1.43	15	1.00	$0.41
Interior Lighting	Linear Fluorescent	T8	0.37	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	0.52	$0.21	10	1.00	$0.05
Interior Lighting	Linear Fluorescent	T5	0.60	$0.16	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	1.12	$0.39	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.00	$0.00	3	1.27	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.00	$0.00	3	1.61	$0.02
Exterior Lighting	Screw-in	CFL	0.00	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.00	$0.00	20	1.42	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.00	$0.00	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.18	$0.33	15	0.14	$0.19
Exterior Lighting	HID	T8	0.18	($0.01)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.19	$0.00	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.23	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.23	$0.01	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.34	$0.09	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.00	$0.00	15	1.00	$0.41
Exterior Lighting	Linear Fluorescent	T8	0.00	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.00	$0.00	10	1.00	$0.05
Exterior Lighting	Linear Fluorescent	T5	0.00	$0.00	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.00	$0.00	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.37	-	12	-	-
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.41	-	12	-	-
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.46	-	12	-	-
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	-	-	12	-	-
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	8400 kWh/yr	-	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	-	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	4330 kWh/yr	-	-	12	-	-
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.10	$0.03	10	1.28	$0.04
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.17	$0.05	10	1.28	$0.04
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.25	$0.08	10	1.28	$0.04
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.10	$0.01	12	6.57	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.31	$0.02	12	6.57	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.41	$0.01	12	> 10	$0.00
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.00	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.00	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	-	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.04	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.03	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.00	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.00	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.01	$0.00	4	7.87	$0.01
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.00	$0.00	15	-	$0.00
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	-	-	15	-	-
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	-	-	15	-	-
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	-	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-38 Energy Efficiency Equipment Data, Natural Gas-Warehouse, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.09	16	0.54	$1.08
Heating	Furnace	EF .82	0.01	$0.24	16	0.29	$1.99
Heating	Furnace	EF .90	0.03	$0.21	16	0.71	$0.82
Heating	Furnace	EF .96	0.03	$0.31	16	0.66	$0.89
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.08	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.13	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.20	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.28	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.01	15	9.09	$0.06
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.00	12	3.29	$0.16
Water Heating	Water Heating	Tankless	0.00	$0.00	12	2.47	$0.22
Water Heating	Water Heating	Indirect Fired	0.00	$0.00	12	6.44	$0.08
Water Heating	Water Heating	EF 0.94	0.00	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	-	-	12	-	-
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	-	-	12	-	-
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	-	-	12	-	-
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	-	-	12	-	-
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	-	-	12	-	-
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	-	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	-	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	-	-	5	1.00	-
Miscellaneous	Pool Heater	EF .90	-	-	5	-	-
Miscellaneous	Pool Heater	EF .95	-	-	5	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-39 Energy Efficiency Equipment Data, Electric-Miscellaneous, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.19	$0.08	20	3.96	$0.04
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.23	$0.09	20	4.21	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.48	$0.10	20	7.86	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.51	$0.11	20	7.56	$0.02
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.30	$0.05	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.34	$0.05	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.39	$0.06	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.47	$0.09	20	8.34	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.49	$0.10	20	7.84	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.53	$0.11	20	7.73	$0.02
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.22	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.44	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.57	$0.03	15	7.04	$0.01
Cooling	Roof top AC	Ductless Minisplit	0.71	$0.11	15	3.38	$0.02
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.24	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.38	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.50	$0.04	15	3.95	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.55	$0.06	15	3.67	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.70	$0.10	15	3.98	$0.02
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.13	$0.02	15	7.39	$0.02
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.24	$0.05	15	6.57	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.59	$0.06	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.16	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.19	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.25	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.07	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.16	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.19	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.25	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.20	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.52	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.02	$0.01	15	-	$0.06
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.03	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.04	$0.03	15	0.19	$0.08
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.04	$0.05	15	0.13	$0.12
Heating	Air Source Heat Pump	Ductless Minisplit	0.05	$0.09	15	0.14	$0.16
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.09	$0.02	15	1.99	$0.03
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.21	$0.05	15	2.23	$0.02
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.54	$0.07	15	4.24	$0.01

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	-	$0.00	15	-	-
Heating	PTAC	EER 10.8	-	$0.01	15	-	-
Heating	PTAC	EER 11	-	$0.01	15	-	-
Heating	PTAC	EER 11.5	-	$0.01	15	-	-
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.07	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.16	$0.01	15	9.98	$0.01
Heating	PTHP	EER 11	0.19	$0.01	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.26	$0.01	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.38	($0.04)	10	1.00	($0.01)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	4.66	$0.01
Water Heating	Water Heating	EF 2.0	0.51	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.58	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.59	$0.00	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.27	$0.02	3	1.13	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.41	$0.02	3	1.53	$0.02
Interior Lighting	Screw-in	CFL	0.77	$0.01	2.2	7.24	$0.00
Interior Lighting	Screw-in	LED (2010)	0.83	$0.13	20	3.32	$0.01
Interior Lighting	Screw-in	LED (2020)	0.96	$0.04	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.21	$0.15	15	0.09	$0.07
Interior Lighting	High-Bay Fixtures	T8	0.21	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.22	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.26	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.27	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.40	$0.03	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.69	$2.87	15	1.00	$0.43
Interior Lighting	Linear Fluorescent	T8	0.72	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.00	$0.42	10	1.00	$0.06
Interior Lighting	Linear Fluorescent	T5	1.15	$0.32	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	2.15	$0.79	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.14	$0.01	3	1.21	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.22	$0.01	3	1.54	$0.02
Exterior Lighting	Screw-in	CFL	0.41	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.45	$0.17	20	1.35	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.52	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.22	$0.42	15	0.13	$0.20
Exterior Lighting	HID	T8	0.22	($0.01)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.24	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.28	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.28	$0.01	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.42	$0.11	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.08	$0.33	15	1.00	$0.43
Exterior Lighting	Linear Fluorescent	T8	0.08	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.11	$0.05	10	1.00	$0.06
Exterior Lighting	Linear Fluorescent	T5	0.13	$0.04	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.25	$0.09	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.09	$0.00	12	> 10	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.10	$0.01	12	6.56	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.03	$0.00	12	> 10	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.11	$0.00	12	6.43	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.02	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.00	12	-	$0.02
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.00	12	2.63	$0.01
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.00	10	1.06	$0.05
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.00	10	1.06	$0.05
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	1.06	$0.05
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	5.79	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.04	$0.00	12	5.79	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.05	$0.00	12	> 10	$0.00
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.10	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.03	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.05	$0.01	4	0.71	$0.06
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	2.51	$0.03
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	1.47	$0.05
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-40 Energy Efficiency Equipment Data, Natural Gas-Miscellaneous, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.02	16	1.76	$0.33
Heating	Furnace	EF .82	0.01	$0.07	16	0.95	$0.61
Heating	Furnace	EF .90	0.02	$0.06	16	2.32	$0.25
Heating	Furnace	EF .96	0.03	$0.08	16	2.14	$0.27
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.03	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.05	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.00	12	4.44	$0.12
Water Heating	Water Heating	Tankless	0.00	$0.01	12	3.33	$0.16
Water Heating	Water Heating	Indirect Fired	0.01	$0.00	12	8.67	$0.06
Water Heating	Water Heating	EF 0.94	0.01	($0.00)	12	1.00	($0.01)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.00	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.00	$0.00	12	> 10	$0.01
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.00	$0.00	12	> 10	$0.04
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.02
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.00	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.00	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.36
Miscellaneous	Pool Heater	EF .90	0.00	$0.01	5	0.14	$2.26
Miscellaneous	Pool Heater	EF .95	0.00	$0.01	5	0.18	$1.92
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-41 Energy Efficiency Equipment Data, Electric-Miscellaneous, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Cooling	Air-Cooled Chiller	1.5 kw/ton, COP 2.3	-	-	20	1.00	-
Cooling	Air-Cooled Chiller	1.3 kw/ton, COP 2.7	0.19	$0.11	20	2.70	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	0.23	$0.13	20	2.87	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	0.49	$0.14	20	5.36	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	0.51	$0.16	20	5.15	$0.03
Cooling	Water-Cooled Chiller	0.75 kw/ton, COP 4.7	-	-	20	1.00	-
Cooling	Water-Cooled Chiller	0.60 kw/ton, COP 5.9	0.19	$0.04	20	6.78	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	0.21	$0.05	20	7.17	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	0.25	$0.06	20	7.04	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	0.30	$0.09	20	5.43	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	0.31	$0.10	20	5.11	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	0.33	$0.11	20	5.03	$0.03
Cooling	Roof top AC	EER 9.2	-	-	15	-	-
Cooling	Roof top AC	EER 10.1	0.22	$0.01	15	-	$0.00
Cooling	Roof top AC	EER 11.2	0.44	$0.01	15	1.00	$0.00
Cooling	Roof top AC	EER 12.0	0.57	$0.03	15	8.33	$0.01
Cooling	Roof top AC	Ductless Minisplit	0.71	$0.09	15	4.01	$0.01
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	0.24	$0.01	15	-	$0.00
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	0.38	$0.00	15	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	0.50	$0.04	15	4.67	$0.01
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	0.55	$0.05	15	4.34	$0.01
Cooling	Air Source Heat Pump	Ductless Minisplit	0.70	$0.09	15	4.71	$0.01
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	0.14	$0.02	15	8.74	$0.02
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	0.26	$0.04	15	7.77	$0.02
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	0.64	$0.06	15	> 10	$0.01
Cooling	PTAC	EER 9.8	-	-	15	1.00	-
Cooling	PTAC	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTAC	EER 10.8	0.15	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11	0.17	$0.01	15	> 10	$0.00
Cooling	PTAC	EER 11.5	0.23	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 9.8	-	-	15	1.00	-
Cooling	PTHP	EER 10.2	0.06	$0.00	15	> 10	$0.00
Cooling	PTHP	EER 10.8	0.15	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11	0.17	$0.01	15	> 10	$0.00
Cooling	PTHP	EER 11.5	0.23	$0.01	15	> 10	$0.00
Cooling	Evaporative AC	Direct	-	-	15	1.00	-
Cooling	Evaporative AC	Indirect	0.20	-	15	-	-
Cooling	Evaporative AC	Direct/Indirect	0.52	-	15	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	15	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	0.03	$0.00	15	-	$0.02
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	0.06	$0.00	15	1.00	$0.00
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	0.08	$0.02	15	0.82	$0.02
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	0.08	$0.03	15	0.55	$0.03
Heating	Air Source Heat Pump	Ductless Minisplit	0.11	$0.05	15	0.65	$0.04
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	15	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	0.11	$0.01	15	5.75	$0.01
Heating	Geothermal Heat Pump	EER 18, COP 3.8	0.25	$0.02	15	6.45	$0.01
Heating	Geothermal Heat Pump	EER 30, COP 5.0	0.63	$0.03	15	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Heating	Electric Room Heat	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Heating	PTAC	EER 9.8	-	-	15	1.00	-
Heating	PTAC	EER 10.2	0.00	$0.00	15	0.31	$0.17
Heating	PTAC	EER 10.8	0.00	$0.00	15	0.10	$0.53
Heating	PTAC	EER 11	0.00	$0.01	15	0.09	$0.57
Heating	PTAC	EER 11.5	0.00	$0.01	15	0.08	$0.67
Heating	PTHP	EER 9.8	-	-	15	1.00	-
Heating	PTHP	EER 10.2	0.06	$0.00	15	> 10	$0.00
Heating	PTHP	EER 10.8	0.15	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11	0.17	$0.00	15	> 10	$0.00
Heating	PTHP	EER 11.5	0.23	$0.00	15	> 10	$0.00
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	0.51	($0.07)	10	1.00	($0.02)
Water Heating	Water Heating	EF .97	-	-	15	1.00	-
Water Heating	Water Heating	EF .98	0.01	$0.00	15	2.57	$0.03
Water Heating	Water Heating	EF 2.0	0.49	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 2.3	0.55	$0.01	15	> 10	$0.00
Water Heating	Water Heating	EF 2.4	0.56	$0.01	15	> 10	$0.00
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	0.27	$0.02	3	1.13	$0.02
Interior Lighting	Screw-in	70W HIR PAR-38	0.41	$0.02	3	1.53	$0.02
Interior Lighting	Screw-in	CFL	0.77	$0.01	2.2	7.24	$0.00
Interior Lighting	Screw-in	LED (2010)	0.83	$0.13	20	3.32	$0.01
Interior Lighting	Screw-in	LED (2020)	0.96	$0.04	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	0.21	$0.15	15	0.09	$0.07
Interior Lighting	High-Bay Fixtures	T8	0.21	($0.01)	10	1.00	($0.01)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	0.22	$0.01	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	0.26	$0.01	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	0.27	$0.01	10	1.00	$0.01
Interior Lighting	High-Bay Fixtures	LED (2020)	0.40	$0.03	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	0.69	$2.87	15	1.00	$0.43
Interior Lighting	Linear Fluorescent	T8	0.72	($0.00)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1.00	$0.42	10	1.00	$0.06
Interior Lighting	Linear Fluorescent	T5	1.15	$0.32	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	LED (2020)	2.15	$0.79	15	-	$0.04
Exterior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.14	$0.01	3	1.21	$0.02
Exterior Lighting	Screw-in	70W HIR PAR-38	0.22	$0.01	3	1.54	$0.02
Exterior Lighting	Screw-in	CFL	0.41	$0.00	6	> 10	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.45	$0.17	20	1.35	$0.03
Exterior Lighting	Screw-in	LED (2020)	0.52	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	0.22	$0.42	15	0.13	$0.20
Exterior Lighting	HID	T8	0.22	($0.01)	10	1.00	($0.01)
Exterior Lighting	HID	High Pressure Sodium	0.24	$0.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	0.28	$0.01	15	1.00	$0.00
Exterior Lighting	HID	T5	0.28	$0.01	10	1.00	$0.01
Exterior Lighting	HID	LED (2020)	0.42	$0.11	15	-	$0.03

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.08	$0.33	15	1.00	$0.43
Exterior Lighting	Linear Fluorescent	T8	0.08	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.11	$0.05	10	1.00	$0.06
Exterior Lighting	Linear Fluorescent	T5	0.13	$0.04	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	LED (2020)	0.25	$0.09	15	-	$0.04
Refrigeration	Walk-in Refrigerator	14600 kWh/yr	-	-	12	1.00	-
Refrigeration	Walk-in Refrigerator	10800 kWh/yr	0.08	$0.00	12	> 10	$0.00
Refrigeration	Walk-in Refrigerator	10000 kWh/yr	0.09	$0.00	12	> 10	$0.01
Refrigeration	Walk-in Refrigerator	9000 kWh/yr	0.10	$0.01	12	6.56	$0.01
Refrigeration	Reach-in Refrigerator	3800 kWh/yr	-	-	12	1.00	-
Refrigeration	Reach-in Refrigerator	3100 kWh/yr	0.02	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2500 kWh/yr	0.03	$0.00	12	> 10	$0.00
Refrigeration	Reach-in Refrigerator	2400 kWh/yr	0.03	$0.00	12	> 10	$0.01
Refrigeration	Reach-in Refrigerator	1500 kWh/yr	0.04	$0.00	12	> 10	$0.00
Refrigeration	Glass Door Display	14480 kWh/yr	-	-	12	-	-
Refrigeration	Glass Door Display	11700 kWh/yr	0.03	$0.00	12	-	$0.01
Refrigeration	Glass Door Display	8400 kWh/yr	0.08	-	12	1.00	-
Refrigeration	Glass Door Display	6800 kWh/yr	0.11	$0.00	12	6.43	$0.00
Refrigeration	Open Display Case	6500 kWh/yr	-	-	12	-	-
Refrigeration	Open Display Case	5350 kWh/yr	0.02	-	12	1.00	-
Refrigeration	Open Display Case	5300 kWh/yr	0.02	$0.00	12	-	$0.02
Refrigeration	Open Display Case	4330 kWh/yr	0.03	$0.00	12	2.63	$0.01
Refrigeration	Icemaker	7.0 kWh/100 lbs	-	-	10	1.00	-
Refrigeration	Icemaker	6.3 kWh/100 lbs	0.01	$0.00	10	1.06	$0.05
Refrigeration	Icemaker	6.0 kWh/100 lbs	0.01	$0.00	10	1.06	$0.05
Refrigeration	Icemaker	5.5 kWh/100 lbs	0.01	$0.01	10	1.06	$0.05
Refrigeration	Vending Machine	3400 kWh/year	-	-	12	1.00	-
Refrigeration	Vending Machine	3000 kWh/year	0.01	$0.00	12	5.81	$0.01
Refrigeration	Vending Machine	2400 kWh/year	0.04	$0.00	12	5.81	$0.01
Refrigeration	Vending Machine	1700 kWh/year	0.05	$0.00	12	> 10	$0.00
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.01	$0.00	12	> 10	$0.00
Food Preparation	Dishwasher	Standard	-	-	12	1.00	-
Food Preparation	Dishwasher	Energy Star	0.05	$0.00	12	> 10	$0.00
Food Preparation	Hot Food Container	Standard	-	-	12	1.00	-
Food Preparation	Hot Food Container	Energy Star	0.03	$0.00	12	> 10	$0.00
Food Preparation	Other	Standard	-	-	12	1.00	-
Office Equipment	Desktop Computer	Standard	-	-	5	1.00	-
Office Equipment	Desktop Computer	Energy Star	0.10	$0.00	5	> 10	$0.00
Office Equipment	Laptop	Standard	-	-	4	1.00	-
Office Equipment	Laptop	Energy Star	0.02	$0.00	4	> 10	$0.00
Office Equipment	Server	Standard	-	-	3	1.00	-
Office Equipment	Server	Energy Star	0.05	$0.00	3	> 10	$0.00
Office Equipment	Monitor	Standard	-	-	4	1.00	-
Office Equipment	Monitor	Energy Star	0.01	$0.00	4	> 10	$0.00
Office Equipment	Printer/Copier/Fax	Standard	-	-	6	1.00	-
Office Equipment	Printer/Copier/Fax	Energy Star	0.03	$0.00	6	> 10	$0.00
Office Equipment	POS Terminal	Standard	-	-	4	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Office Equipment	POS Terminal	Energy Star	0.05	$0.01	4	0.71	$0.06
Miscellaneous	Non-HVAC Motors	Standard (EPAct)	-	-	15	1.00	-
Miscellaneous	Non-HVAC Motors	Standard (EPAct 2015)	0.00	-	15	-	-
Miscellaneous	Non-HVAC Motors	High Efficiency	0.00	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	High Efficiency (2015)	0.01	$0.00	15	-	$0.00
Miscellaneous	Non-HVAC Motors	Premium (NEMA)	0.01	$0.00	15	> 10	$0.01
Miscellaneous	Non-HVAC Motors	Premium (NEMA 2015)	0.01	$0.00	15	-	$0.01
Miscellaneous	Pool Pump	Standard	-	-	15	1.00	-
Miscellaneous	Pool Pump	High Efficiency	0.00	$0.00	15	2.51	$0.03
Miscellaneous	Pool Pump	High Efficiency, Multi-Speed	0.00	$0.00	15	1.47	$0.05
Miscellaneous	Pool Heater	Standard	-	-	15	1.00	-
Miscellaneous	Pool Heater	Heat Pump	0.00	-	15	-	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-42 Energy Efficiency Equipment Data, Natural Gas-Miscellaneous, New Vintage

End Use	Technology	Efficiency Definition	Savings (Therms/sq ft/yr)	Incre-mental Cost ($/sq ft)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/Therm)
Heating	Furnace	EF .76	-	-	16	1.00	-
Heating	Furnace	EF .80	0.01	$0.01	16	3.74	$0.16
Heating	Furnace	EF .82	0.01	$0.03	16	2.02	$0.29
Heating	Furnace	EF .90	0.02	$0.03	16	4.92	$0.12
Heating	Furnace	EF .96	0.03	$0.04	16	4.54	$0.13
Heating	Boiler	EF .76	-	-	20	-	-
Heating	Boiler	EF .80	0.01	$0.00	20	1.00	$0.00
Heating	Boiler	EF .83	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .90	0.02	$0.00	20	> 10	$0.00
Heating	Boiler	EF .96	0.03	$0.00	20	> 10	$0.00
Heating	Unit Heater	Standard	-	-	15	1.00	-
Heating	Unit Heater	Condensing	0.02	$0.00	15	> 10	$0.00
Water Heating	Water Heating	EF 0.77	-	-	12	1.00	-
Water Heating	Water Heating	EF 0.80	0.00	$0.00	12	2.49	$0.22
Water Heating	Water Heating	Tankless	0.00	$0.01	12	1.87	$0.29
Water Heating	Water Heating	Indirect Fired	0.01	$0.01	12	4.80	$0.11
Water Heating	Water Heating	EF 0.94	0.01	($0.00)	12	1.00	($0.02)
Food Preparation	Oven	Standard	-	-	12	1.00	-
Food Preparation	Oven	Energy Star	0.00	$0.00	12	> 10	$0.01
Food Preparation	Fryer	Standard	-	-	12	1.00	-
Food Preparation	Fryer	Energy Star	0.00	$0.00	12	> 10	$0.01
Food Preparation	Broiler	Standard	-	-	12	1.00	-
Food Preparation	Broiler	High Efficiency	0.00	$0.00	12	> 10	$0.04
Food Preparation	Griddle	Standard	-	-	12	1.00	-
Food Preparation	Griddle	High Efficiency	0.00	$0.00	12	> 10	$0.02
Food Preparation	Range	Standard	-	-	12	1.00	-
Food Preparation	Range	High Efficiency	0.00	$0.00	12	> 10	$0.01
Food Preparation	Steamer	Standard	-	-	12	1.00	-
Food Preparation	Steamer	Energy Star	0.00	-	12	-	-
Food Preparation	Other	Standard	-	-	12	1.00	-
Food Preparation	Other	Energy Star	0.00	-	12	-	-
Miscellaneous	Pool Heater	EF .78	-	-	5	-	-
Miscellaneous	Pool Heater	EF .82	0.00	$0.00	5	1.00	$0.36
Miscellaneous	Pool Heater	EF .90	0.00	$0.01	5	0.14	$2.26
Miscellaneous	Pool Heater	EF .95	0.00	$0.01	5	0.18	$1.92
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table C-43 Energy Efficiency Non-Equipment Data- Electric Office, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	21,249.6	$/bldg	245,001.9	1.25	0.05
Insulation - Ducting	17%	50%	20	0.8	$/sqft	0.7	0.31	0.09
Insulation - Radiant Barrier	7%	13%	20	5,429.6	$/bldg	95,772.7	1.92	0.04
Insulation - Wall Cavity	7%	13%	20	26,830.6	$/bldg	545,078.1	2.16	0.03
HVAC - Duct Repair and Sealing	5%	25%	18	66.8	$/bldg	175,495.5	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.2	1.03	0.05
Windows - High Efficiency	75%	80%	20	29,863.8	$/bldg	3,842,949.7	> 10	0.01
Roof - High Reflectivity	42%	75%	15	833.3	$/bldg	48,982.4	8.17	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	829,874.2	> 10	0.00
Air-Cooled Chiller - Economizer	25%	49%	10	813.6	$/sqft	903,336.4	> 10	0.00
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,521.0	$/bldg	433.1	1.27	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	617,989.5	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	140,120.6	0.58	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.48	0.02
Air-Cooled Chiller - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	7.87	0.00
Water-Cooled Chiller - Economizer	25%	49%	10	2,717.6	$/sqft	903,336.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	16.4	1.06	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	829,874.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	140,120.6	0.44	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	2.60	0.02
Water-Cooled Chiller - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	7.99	0.02
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	1.4	0.04	0.09
RTU - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	9.22	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.5	0.03	0.08
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,490,100.0	1.69	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	651,800.0	0.36	0.00
Gas Furnace - Maintenance	25%	90%	3	2,039.9	$/bldg	196,900.0	0.11	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.1	> 10	0.00
Heat Pump - Maintenance	8%	95%	18	4,675.9	$/bldg	651,404.2	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.2	5.44	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.1	> 10	0.01
Ventilation - CO2 Controlled	1%	11%	15	0.2	$/sqft	7.1	2.30	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.6	0.34	0.02
Water Heater - Faucet Aerators	42%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	0.9	0.05	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.6	0.90	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	13.7	> 10	0.00
Water Heater - Install Timer	33%	38%	15	0.3	$/sqft	1.5	0.26	0.07
Water Heater - Pipe Insulation	33%	38%	12	2,610.0	$/bldg	20,290.2	0.57	0.07
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.9	0.88	0.02
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	6.40	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	18.3	0.19	0.03
Interior Lighting - Daylighting Controls	8%	13%	8	0.1	$/sqft	3.1	1.30	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	25%	56%	8	0.1	$/sqft	1.0	0.68	0.05
Interior Lighting - Task Lighting	42%	75%	5	0.2	$/sqft	1.1	0.12	0.13
Interior Lighting - Timeclocks and Timers	8%	56%	8	0.2	$/sqft	0.5	0.12	0.13
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.2	0.19	0.10
Interior Fluorescent - Delamp and Install Reflectors	33%	68%	11	0.5	$/sqft	0.9	0.12	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.22	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.49	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	3.58	0.01
Refrigerator - Decommissioning	50%	0%	8	0.1	$/sqft	5.9	1.36	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.01	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.1	0.02	0.16
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	-	0.00	-
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.49	0.04
Refrigerator - Floating Head Pressure	38%	45%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.38	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.57	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	0.3	0.00	0.18
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	6.84	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.0	0.02	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	3.33	0.02
Office Equipment - Plug Load Occupancy Sensors	13%	56%	5	5,437.4	$/bldg	157,666.0	0.49	0.03
Pool Pump - Timer	8%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	4.8	0.00	0.11
Non-HVAC Motors - Variable Speed Control	8%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	8%	90%	15	31,723.2	$/bldg	1,605,422.8	4.04	0.02
Thermostat - Clock/Programmable	58%	63%	11	937.5	$/bldg	9,105.8	0.86	0.06
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.64	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.9	0.55	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.9	1.37	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	4.7	1.92	0.01
Retrocommissioning - HVAC	9%	36%	25	0.8	$/sqft	3.9	0.69	0.06
Retrocommissioning - Lighting	67%	72%	5	0.1	$/sqft	4.7	0.96	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	10.3	2.50	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.95	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.1	0.58	0.05
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	> 10	0.00
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	2.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.3	0.33	0.09
Water Heating - Booster Water Heater	33%	38%	20	0.0	$/sqft	0.6	6.02	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	-	0.00	-
Boiler O2 Trim Controls	25%	49%	15	0.0	$/sqft	1.2	0.66	0.01
Boiler Parallel Positioning Control	25%	49%	15	0.2	$/sqft	1.2	0.05	0.07
Boiler blowdown heat exchanger (steam)	25%	49%	20	1.0	$/sqft	3.4	0.05	0.07
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	33%	38%	12	1,302.0	$/bldg	1.2	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.3	$/sqft	7.8	0.15	0.03
Exhaust Hood Makeup Air	1%	11%	10	0.2	$/sqft	8.6	0.26	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-44 Energy Efficiency Non-Equipment Data-Natural Gas Office, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	21,249.6	$/bldg	245,001.9	1.78	0.05
Insulation - Ducting	17%	50%	20	0.8	$/sqft	0.7	0.37	0.09
Insulation - Radiant Barrier	7%	13%	20	5,429.6	$/bldg	95,772.7	2.72	0.04
Insulation - Wall Cavity	7%	13%	20	26,830.6	$/bldg	545,078.1	2.94	0.03
HVAC - Duct Repair and Sealing	5%	25%	18	66.8	$/bldg	175,495.5	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.2	1.17	0.05
Windows - High Efficiency	75%	80%	20	29,863.8	$/bldg	3,842,949.7	> 10	0.01
Roof - High Reflectivity	42%	75%	15	833.3	$/bldg	48,982.4	> 10	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	829,874.2	> 10	0.00
Air-Cooled Chiller - Economizer	25%	49%	10	813.6	$/sqft	903,336.4	> 10	0.00
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,521.0	$/bldg	433.1	1.37	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	617,989.5	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	140,120.6	0.63	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	9.79	0.00
Water-Cooled Chiller - Economizer	25%	49%	10	2,717.6	$/sqft	903,336.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	16.4	1.53	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	829,874.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	140,120.6	0.63	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Water-Cooled Chiller - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	> 10	0.02
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	1.4	0.06	0.09
RTU - Maintenance	42%	90%	18	9,374.8	$/bldg	387,152.3	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.5	0.28	0.08
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,490,100.0	> 10	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	651,800.0	3.83	0.00
Gas Furnace - Maintenance	25%	90%	3	2,039.9	$/bldg	196,900.0	1.33	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.1	> 10	0.00
Heat Pump - Maintenance	8%	95%	18	4,675.9	$/bldg	651,404.2	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.2	5.86	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.1	> 10	0.01

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	1%	11%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.6	0.88	0.02
Water Heater - Faucet Aerators	42%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	0.9	0.12	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.6	2.12	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	13.7	> 10	0.00
Water Heater - Install Timer	33%	38%	15	0.3	$/sqft	1.5	0.55	0.07
Water Heater - Pipe Insulation	33%	38%	12	2,610.0	$/bldg	20,290.2	0.71	0.07
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.9	2.27	0.02
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	7.53	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	18.3	1.95	0.03
Interior Lighting - Daylighting Controls	8%	13%	8	0.1	$/sqft	3.1	1.58	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	25%	56%	8	0.1	$/sqft	1.0	0.83	0.05
Interior Lighting - Task Lighting	42%	75%	5	0.2	$/sqft	1.1	0.12	0.13
Interior Lighting - Timeclocks and Timers	8%	56%	8	0.2	$/sqft	0.5	0.15	0.13
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.2	0.24	0.10
Interior Fluorescent - Delamp and Install Reflectors	33%	68%	11	0.5	$/sqft	0.9	0.16	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.31	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.98	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.45	0.01
Refrigerator - Decommissioning	50%	0%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.01	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.1	0.02	0.16
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	-	0.00	-
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	2.03	0.04
Refrigerator - Floating Head Pressure	38%	45%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.86	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	0.3	0.00	0.18
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.0	0.03	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	3.58	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	13%	56%	5	5,437.4	$/bldg	157,666.0	0.53	0.03
Pool Pump - Timer	8%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	4.8	0.00	0.11
Non-HVAC Motors - Variable Speed Control	8%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	8%	90%	15	31,723.2	$/bldg	1,605,422.8	5.05	0.02
Thermostat - Clock/Programmable	58%	63%	11	937.5	$/bldg	9,105.8	1.04	0.06
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.9	0.65	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.9	1.74	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	4.7	2.26	0.01
Retrocommissioning - HVAC	9%	36%	25	0.8	$/sqft	3.9	0.87	0.06
Retrocommissioning - Lighting	67%	72%	5	0.1	$/sqft	4.7	1.13	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	10.3	3.18	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.99	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.1	0.77	0.05
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	> 10	0.00
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	2.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.3	0.41	0.09
Water Heating - Booster Water Heater	33%	38%	20	0.0	$/sqft	0.6	6.17	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	-	0.00	-
Boiler O2 Trim Controls	25%	49%	15	0.0	$/sqft	1.2	6.40	0.01
Boiler Parallel Positioning Control	25%	49%	15	0.2	$/sqft	1.2	0.44	0.07
Boiler blowdown heat exchanger (steam)	25%	49%	20	1.0	$/sqft	3.4	0.46	0.07
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	4.74	0.01
Insulate steam lines/condensate tank	33%	38%	12	1,302.0	$/bldg	1.2	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.3	$/sqft	7.8	1.50	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	11%	10	0.2	$/sqft	8.6	2.62	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-45 Energy Efficiency Non-Equipment Data-Electric Office, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	21,249.6	$/bldg	181,453.3	1.00	0.05
Insulation - Ducting	0%	50%	20	0.8	$/sqft	-	0.17	-
Insulation - Radiant Barrier	7%	13%	20	5,429.6	$/bldg	58,526.8	1.24	0.05
Insulation - Wall Cavity	7%	13%	20	26,830.6	$/bldg	339,314.7	1.22	0.04
HVAC - Duct Repair and Sealing	25%	25%	18	66.8	$/bldg	154,366.3	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.2	1.08	0.05
Windows - High Efficiency	100%	100%	20	29,863.8	$/bldg	1,729,749.5	6.28	0.01
Roof - High Reflectivity	50%	95%	15	833.3	$/bldg	16,468.0	6.08	0.04
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	466,210.2	> 10	0.00
Air-Cooled Chiller - Economizer	54%	55%	10	813.6	$/sqft	961,071.3	> 10	0.00
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,521.0	$/bldg	1,287.8	1.25	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	364,621.3	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	127,196.9	0.54	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188.9	1.94	0.05
Air-Cooled Chiller - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.5	6.47	0.00
Water-Cooled Chiller - Economizer	54%	55%	10	2,717.6	$/sqft	961,071.3	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.9	1.11	0.05
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	466,210.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	127,196.9	0.54	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
RTU - Evaporative Precooler	0%	1%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	2.5	0.03	0.08
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	642,600.0	0.73	0.00
Gas Boiler - Maintenance	50%	90%	3	2,039.9	$/bldg	641,800.0	0.35	0.00
Gas Furnace - Maintenance	50%	90%	3	2,039.9	$/bldg	241,200.0	0.13	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.5	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	4,675.9	$/bldg	474,974.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	8.5	6.87	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.8	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	9%	11%	15	0.2	$/sqft	7.1	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.6	0.33	0.02
Water Heater - Faucet Aerators	50%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	0.9	0.05	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.5	0.88	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	13.0	> 10	0.01
Water Heater - Install Timer	100%	100%	15	0.3	$/sqft	1.5	0.26	0.07
Water Heater - Pipe Insulation	100%	100%	12	2,610.0	$/bldg	21,507.0	0.60	0.06
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.9	0.87	0.02
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	18.3	0.19	0.03
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	3.1	1.53	0.03
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.0	0.80	0.05
Interior Lighting - Task Lighting	50%	75%	5	0.2	$/sqft	1.1	0.11	0.13
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.5	0.14	0.13
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.2	0.23	0.10
Interior Fluorescent - Delamp and Install Reflectors	100%	100%	11	0.5	$/sqft	0.9	0.15	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.31	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.85	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.39	0.01
Refrigerator - Decommissioning	50%	0%	8	0.1	$/sqft	5.9	1.64	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.01	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.1	0.02	0.16
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	-	0.00	-
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.88	0.04
Refrigerator - Floating Head Pressure	38%	45%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.42	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.89	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	0.3	0.00	0.18
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.50	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.0	0.03	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	3.57	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	13%	56%	5	5,437.4	$/bldg	157,666.0	0.50	0.03
Pool Pump - Timer	34%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	4.8	0.00	0.11
Non-HVAC Motors - Variable Speed Control	50%	55%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	50%	90%	15	31,723.2	$/bldg	1,841,228.0	4.41	0.01
Thermostat - Clock/Programmable	50%	50%	11	937.5	$/bldg	31,614.0	3.63	0.02
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.07	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.7	0.53	0.10
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	3.1	1.42	0.05
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	4.7	2.19	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	3.1	0.71	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	4.7	1.09	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	8.4	2.59	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.24	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.1	0.72	0.05
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	> 10	0.00
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	2.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.0	1.43	0.07
Water Heating - Booster Water Heater	100%	100%	20	0.0	$/sqft	0.6	5.97	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	-	0.00	-
Boiler O2 Trim Controls	54%	55%	15	0.0	$/sqft	1.2	0.66	0.01
Boiler Parallel Positioning Control	54%	55%	15	0.2	$/sqft	1.2	0.05	0.07
Boiler blowdown heat exchanger (steam)	54%	55%	20	1.0	$/sqft	3.4	0.05	0.07
Repair malfunctioning steam traps	50%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	100%	100%	12	1,302.0	$/bldg	1.2	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.3	$/sqft	8.1	0.16	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	11%	10	0.2	$/sqft	9.0	0.28	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-46 Energy Efficiency Non-Equipment Data-Natural Gas Office, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	21,249.6	$/bldg	181,453.3	1.31	0.05
Insulation - Ducting	0%	50%	20	0.8	$/sqft	-	0.17	-
Insulation - Radiant Barrier	7%	13%	20	5,429.6	$/bldg	58,526.8	1.65	0.05
Insulation - Wall Cavity	7%	13%	20	26,830.6	$/bldg	339,314.7	1.76	0.04
HVAC - Duct Repair and Sealing	25%	25%	18	66.8	$/bldg	154,366.3	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.2	1.08	0.05
Windows - High Efficiency	100%	100%	20	29,863.8	$/bldg	1,729,749.5	9.06	0.01
Roof - High Reflectivity	50%	95%	15	833.3	$/bldg	16,468.0	6.07	0.04
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	466,210.2	> 10	0.00
Air-Cooled Chiller - Economizer	54%	55%	10	813.6	$/sqft	961,071.3	> 10	0.00
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,521.0	$/bldg	1,287.8	1.25	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	364,621.3	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	127,196.9	0.54	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Air-Cooled Chiller - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.5	6.47	0.00
Water-Cooled Chiller - Economizer	54%	55%	10	2,717.6	$/sqft	961,071.3	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.9	1.11	0.05
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	466,210.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	127,196.9	0.54	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
RTU - Evaporative Precooler	0%	1%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	50%	90%	18	9,374.8	$/bldg	330,614.0	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	2.5	0.33	0.08
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	642,600.0	9.08	0.00
Gas Boiler - Maintenance	50%	90%	3	2,039.9	$/bldg	641,800.0	4.41	0.00
Gas Furnace - Maintenance	50%	90%	3	2,039.9	$/bldg	241,200.0	1.64	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.5	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	4,675.9	$/bldg	474,974.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	8.5	6.90	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.8	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	9%	11%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.6	0.86	0.02
Water Heater - Faucet Aerators	50%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	0.9	0.12	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.5	2.06	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	13.0	> 10	0.01
Water Heater - Install Timer	100%	100%	15	0.3	$/sqft	1.5	0.54	0.07
Water Heater - Pipe Insulation	100%	100%	12	2,610.0	$/bldg	21,507.0	0.75	0.06
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.9	2.23	0.02
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	18.3	2.18	0.03
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	3.1	1.58	0.03
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.0	0.83	0.05
Interior Lighting - Task Lighting	50%	75%	5	0.2	$/sqft	1.1	0.12	0.13
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.5	0.15	0.13
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.2	0.24	0.10
Interior Fluorescent - Delamp and Install Reflectors	100%	100%	11	0.5	$/sqft	0.9	0.16	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.31	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.98	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.45	0.01
Refrigerator - Decommissioning	50%	0%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.01	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.1	0.02	0.16
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	-	0.00	-
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	2.03	0.04
Refrigerator - Floating Head Pressure	38%	45%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.86	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	0.3	0.00	0.18
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.0	0.03	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	3.58	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	13%	56%	5	5,437.4	$/bldg	157,666.0	0.53	0.03
Pool Pump - Timer	34%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	4.8	0.00	0.11
Non-HVAC Motors - Variable Speed Control	50%	55%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	50%	90%	15	31,723.2	$/bldg	1,841,228.0	5.28	0.01
Thermostat - Clock/Programmable	50%	50%	11	937.5	$/bldg	31,614.0	3.63	0.02
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.7	0.53	0.10
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	3.1	1.41	0.05
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	4.7	2.25	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	3.1	0.71	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	4.7	1.13	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	8.4	2.59	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.92	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.1	0.78	0.05
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	> 10	0.00
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	2.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.0	1.43	0.07
Water Heating - Booster Water Heater	100%	100%	20	0.0	$/sqft	0.6	5.97	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	-	0.00	-
Boiler O2 Trim Controls	54%	55%	15	0.0	$/sqft	1.2	7.61	0.01
Boiler Parallel Positioning Control	54%	55%	15	0.2	$/sqft	1.2	0.52	0.07
Boiler blowdown heat exchanger (steam)	54%	55%	20	1.0	$/sqft	3.4	0.55	0.07
Repair malfunctioning steam traps	50%	90%	6	77.0	$/sqft	13,880.0	5.59	0.01
Insulate steam lines/condensate tank	100%	100%	12	1,302.0	$/bldg	1.2	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.3	$/sqft	8.1	1.87	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	11%	10	0.2	$/sqft	9.0	3.27	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-47 Energy Efficiency Non-Equipment Data-Electric Restaurant, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.47	0.07
Insulation - Ducting	11%	50%	20	0.8	$/sqft	0.8	0.16	0.09
Insulation - Radiant Barrier	4%	13%	20	14,360.4	$/bldg	92,766.4	0.79	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	217,391.3	0.54	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	56.0	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	3.5	1.54	0.03
Windows - High Efficiency	54%	75%	20	2,181.0	$/bldg	97,788.4	5.51	0.02
Roof - High Reflectivity	36%	95%	15	2,204.0	$/bldg	183,780.8	8.71	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	433.1	1.58	0.11
Air-Cooled Chiller - Chilled Water Reset	0%	75%	10	814.4	$/sqft	836,586.8	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.42	0.08
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.64	0.02
Air-Cooled Chiller - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	8.55	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	10.2	> 10	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138.1	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	30.7	3.97	0.03
Water-Cooled Chiller - Chilled Water Reset	0%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Water-Cooled Chiller - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	2.5	0.08	0.09
RTU - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	6.95	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.3	0.03	0.09
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	1,440,300.0	1.63	0.00
Gas Boiler - Maintenance	39%	90%	3	2,039.9	$/bldg	346,700.0	0.19	0.01
Gas Furnace - Maintenance	39%	90%	3	2,057.0	$/bldg	27,100.0	0.01	0.07
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	7.2	> 10	0.00
Heat Pump - Maintenance	4%	95%	18	3,921.2	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	6.4	4.00	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	3.6	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	1%	15%	15	0.2	$/sqft	7.1	1.92	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	10.7	3.32	0.00
Water Heater - Faucet Aerators	29%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	6.0	0.56	0.05
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	23.9	9.08	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	89.5	> 10	0.00
Water Heater - Install Timer	11%	50%	15	0.3	$/sqft	10.1	2.71	0.02
Water Heater - Pipe Insulation	11%	50%	12	3,001.4	$/bldg	35,750.0	0.66	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	6.0	8.71	0.00
Water Heater - Pre-Rinse Spray Valve	29%	90%	5	100.0	$/sqft	14,822.0	6.43	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	16.5	0.17	0.03
Interior Lighting - Daylighting Controls	0%	50%	8	0.1	$/sqft	3.2	1.04	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	0%	56%	8	0.1	$/sqft	1.1	0.55	0.05
Interior Lighting - Task Lighting	4%	75%	5	0.2	$/sqft	1.1	0.08	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.5	0.10	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.0	0.07	0.14
Interior Fluorescent - Delamp and Install Reflectors	7%	38%	11	0.5	$/sqft	0.9	0.10	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.04	0.14
Exterior Lighting - Daylighting Controls	19%	38%	8	0.0	$/sqft	0.8	1.00	0.02
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.9	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.46	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	3.58	0.01
Refrigerator - Decommissioning	50%	25%	8	0.1	$/sqft	5.9	1.33	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	2.4	0.91	0.05
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	2.9	0.64	0.03
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	5.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.46	0.04
Refrigerator - Floating Head Pressure	18%	38%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.18	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.38	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.57	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	6.8	0.09	0.11
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	6.84	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.9	0.50	0.04
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	2.78	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	7%	56%	5	7,190.6	$/bldg	37,713.8	0.09	0.12
Pool Pump - Timer	0%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	-	0.00	-
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	7%	50%	15	41,951.5	$/bldg	899,536.2	1.52	0.03
Thermostat - Clock/Programmable	50%	50%	11	1,239.8	$/bldg	9,105.8	0.56	0.07
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.58	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	1.7	0.90	0.06
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	7.7	2.70	0.03
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	4.9	1.82	0.01
Retrocommissioning - HVAC	5%	24%	25	0.8	$/sqft	7.7	1.35	0.05
Retrocommissioning - Lighting	11%	16%	5	0.1	$/sqft	4.9	0.91	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	20.4	4.03	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.09	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	3.5	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	3.63	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	2.6	0.53	0.08
Water Heating - Booster Water Heater	11%	50%	20	0.0	$/sqft	6.2	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	24.3	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	1.1	0.79	0.01
Boiler Parallel Positioning Control	0%	49%	15	0.2	$/sqft	1.1	0.05	0.07
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.7	$/sqft	3.1	0.06	0.07
Repair malfunctioning steam traps	39%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	11%	50%	12	1,302.0	$/bldg	1.1	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.2	$/sqft	5.8	0.15	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	15%	10	0.1	$/sqft	6.5	0.26	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-48 Energy Efficiency Non-Equipment Data-Natural Gas Restaurant, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.71	0.07
Insulation - Ducting	11%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Radiant Barrier	4%	13%	20	14,360.4	$/bldg	92,766.4	1.18	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	217,391.3	0.82	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	56.0	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	3.5	1.82	0.03
Windows - High Efficiency	54%	75%	20	2,181.0	$/bldg	97,788.4	7.59	0.02
Roof - High Reflectivity	36%	95%	15	2,204.0	$/bldg	183,780.8	> 10	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	433.1	1.63	0.11
Air-Cooled Chiller - Chilled Water Reset	0%	75%	10	814.4	$/sqft	836,586.8	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	10.2	> 10	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138.1	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	30.7	3.97	0.03
Water-Cooled Chiller - Chilled Water Reset	0%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Water-Cooled Chiller - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	2.5	0.10	0.09
RTU - Maintenance	64%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.3	0.27	0.09
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	1,440,300.0	> 10	0.00
Gas Boiler - Maintenance	39%	90%	3	2,039.9	$/bldg	346,700.0	2.18	0.01
Gas Furnace - Maintenance	39%	90%	3	2,057.0	$/bldg	27,100.0	0.18	0.07
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	7.2	> 10	0.00
Heat Pump - Maintenance	4%	95%	18	3,921.2	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	6.4	5.19	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	3.6	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	1%	15%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	10.7	5.41	0.00
Water Heater - Faucet Aerators	29%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	6.0	0.80	0.05
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	23.9	> 10	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	89.5	> 10	0.00
Water Heater - Install Timer	11%	50%	15	0.3	$/sqft	10.1	3.84	0.02
Water Heater - Pipe Insulation	11%	50%	12	3,001.4	$/bldg	35,750.0	0.88	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	6.0	> 10	0.00
Water Heater - Pre-Rinse Spray Valve	29%	90%	5	100.0	$/sqft	14,822.0	7.54	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	16.5	1.83	0.03
Interior Lighting - Daylighting Controls	0%	50%	8	0.1	$/sqft	3.2	1.40	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	0%	56%	8	0.1	$/sqft	1.1	0.73	0.05
Interior Lighting - Task Lighting	4%	75%	5	0.2	$/sqft	1.1	0.11	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.5	0.13	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.0	0.09	0.14
Interior Fluorescent - Delamp and Install Reflectors	7%	38%	11	0.5	$/sqft	0.9	0.14	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	19%	38%	8	0.0	$/sqft	0.8	1.27	0.02
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.9	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.98	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.45	0.01
Refrigerator - Decommissioning	50%	25%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	2.4	1.26	0.05
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	2.9	0.95	0.03
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	5.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	2.03	0.04
Refrigerator - Floating Head Pressure	18%	38%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.86	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	6.8	0.11	0.11
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.9	0.60	0.04
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.58	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	7%	56%	5	7,190.6	$/bldg	37,713.8	0.10	0.12
Pool Pump - Timer	0%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	-	0.00	-
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	7%	50%	15	41,951.5	$/bldg	899,536.2	1.90	0.03
Thermostat - Clock/Programmable	50%	50%	11	1,239.8	$/bldg	9,105.8	0.68	0.07
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	1.7	1.07	0.06
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	7.7	3.45	0.03
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	4.9	2.36	0.01
Retrocommissioning - HVAC	5%	24%	25	0.8	$/sqft	7.7	1.73	0.05
Retrocommissioning - Lighting	11%	16%	5	0.1	$/sqft	4.9	1.18	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	20.4	5.18	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.16	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	3.5	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	4.01	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	2.6	0.67	0.08
Water Heating - Booster Water Heater	11%	50%	20	0.0	$/sqft	6.2	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	24.3	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	1.1	8.19	0.01
Boiler Parallel Positioning Control	0%	49%	15	0.2	$/sqft	1.1	0.56	0.07
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.7	$/sqft	3.1	0.59	0.07
Repair malfunctioning steam traps	39%	90%	6	77.0	$/sqft	13,880.0	5.08	0.01
Insulate steam lines/condensate tank	11%	50%	12	1,302.0	$/bldg	1.1	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.2	$/sqft	5.8	1.60	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	15%	10	0.1	$/sqft	6.5	2.81	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-49 Energy Efficiency Non-Equipment Data-Electric Restaurant, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560.1	0.61	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Radiant Barrier	4%	13%	20	14,360.4	$/bldg	92,849.9	0.84	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989.3	0.37	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	56.0	$/bldg	46,691.7	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.9	1.39	0.04
Windows - High Efficiency	0%	75%	20	2,181.0	$/bldg	118,047.2	6.45	0.02
Roof - High Reflectivity	50%	95%	15	2,204.0	$/bldg	73,416.6	5.78	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553.0	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	1,287.8	1.49	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	134,798.4	0.44	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	18,188.9	1.94	0.05
Air-Cooled Chiller - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.39	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	6.3	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553.0	8.02	0.01
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	25.5	3.31	0.03
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	134,798.4	0.43	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.4	0.06	0.09
RTU - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	1.4	0.02	0.10
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	978,400.0	1.11	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	228,900.0	0.13	0.01
Gas Furnace - Maintenance	0%	90%	3	2,057.0	$/bldg	47,400.0	0.03	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	5.8	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,921.2	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.7	6.11	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	12%	15%	15	0.2	$/sqft	7.1	2.41	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	10.3	3.24	0.00
Water Heater - Faucet Aerators	29%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	5.7	0.55	0.05
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	22.8	8.87	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	85.5	> 10	0.00
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	9.7	2.66	0.02
Water Heater - Pipe Insulation	50%	50%	12	3,001.4	$/bldg	32,559.2	0.59	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	5.7	8.52	0.00
Water Heater - Pre-Rinse Spray Valve	29%	90%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	10.3	0.11	0.05
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	3.3	1.35	0.03
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.1	0.71	0.05
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	1.1	0.10	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.5	0.12	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.0	0.09	0.14
Interior Fluorescent - Delamp and Install Reflectors	0%	38%	11	0.5	$/sqft	0.9	0.13	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	19%	38%	8	0.0	$/sqft	0.8	1.27	0.02
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.9	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.91	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.39	0.01
Refrigerator - Decommissioning	50%	25%	8	0.1	$/sqft	5.9	1.69	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	1.1	0.53	0.07
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	2.9	0.93	0.03
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	5.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.95	0.04
Refrigerator - Floating Head Pressure	18%	38%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.30	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.49	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.89	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	6.8	0.11	0.11
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.50	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.9	0.59	0.04
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.49	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	7%	56%	5	7,190.6	$/bldg	37,713.8	0.09	0.12
Pool Pump - Timer	34%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	-	0.00	-
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	0%	50%	15	41,951.5	$/bldg	531,443.5	0.99	0.05
Thermostat - Clock/Programmable	50%	50%	11	1,239.8	$/bldg	31,614.0	2.36	0.03
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.03	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.2	0.74	0.07
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	5.3	2.38	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	4.9	2.30	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	5.3	1.19	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	4.9	1.15	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	14.1	3.57	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.32	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	3.4	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	3.81	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.8	1.97	0.06
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	6.0	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	24.3	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.7	0.49	0.02
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.7	0.03	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	1.9	0.04	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.7	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.2	$/sqft	4.2	0.11	0.04

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	15%	10	0.1	$/sqft	4.7	0.19	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-50 Energy Efficiency Non-Equipment Data-Natural Gas Restaurant, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560.1	0.71	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Radiant Barrier	4%	13%	20	14,360.4	$/bldg	92,849.9	0.99	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989.3	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	56.0	$/bldg	46,691.7	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.9	1.40	0.04
Windows - High Efficiency	0%	75%	20	2,181.0	$/bldg	118,047.2	8.36	0.02
Roof - High Reflectivity	50%	95%	15	2,204.0	$/bldg	73,416.6	5.82	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553.0	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	1,287.8	1.49	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	134,798.4	0.43	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Air-Cooled Chiller - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	6.3	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553.0	8.02	0.01
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	25.5	3.31	0.03
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	134,798.4	0.43	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.4	0.06	0.09
RTU - Maintenance	100%	100%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	1.4	0.19	0.10
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	978,400.0	> 10	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	228,900.0	1.57	0.01
Gas Furnace - Maintenance	0%	90%	3	2,057.0	$/bldg	47,400.0	0.32	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	5.8	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,921.2	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.7	6.28	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	4.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	12%	15%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	10.3	5.24	0.00
Water Heater - Faucet Aerators	29%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	5.7	0.78	0.05
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	22.8	> 10	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	85.5	> 10	0.00
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	9.7	3.72	0.02
Water Heater - Pipe Insulation	50%	50%	12	3,001.4	$/bldg	32,559.2	0.78	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	5.7	> 10	0.00
Water Heater - Pre-Rinse Spray Valve	29%	90%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	10.3	1.23	0.05
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	3.3	1.40	0.03
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.1	0.74	0.05
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	1.1	0.11	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.5	0.13	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.0	0.09	0.14
Interior Fluorescent - Delamp and Install Reflectors	0%	38%	11	0.5	$/sqft	0.9	0.14	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	19%	38%	8	0.0	$/sqft	0.8	1.27	0.02
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.9	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.98	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	4.45	0.01
Refrigerator - Decommissioning	50%	25%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	1.1	0.55	0.07
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	2.9	0.95	0.03
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	5.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	2.03	0.04
Refrigerator - Floating Head Pressure	18%	38%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.86	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	6.8	0.11	0.11
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.9	0.60	0.04
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.58	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	7%	56%	5	7,190.6	$/bldg	37,713.8	0.10	0.12
Pool Pump - Timer	34%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	-	0.00	-
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	0%	50%	15	41,951.5	$/bldg	531,443.5	1.02	0.05
Thermostat - Clock/Programmable	50%	50%	11	1,239.8	$/bldg	31,614.0	2.37	0.03
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.2	0.74	0.07
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	5.3	2.39	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	4.9	2.37	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	5.3	1.19	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	4.9	1.19	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	14.1	3.59	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.00	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	3.4	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	4.01	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.8	1.98	0.06
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	6.0	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	24.3	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.7	5.68	0.02
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.7	0.39	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	1.9	0.41	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	5.59	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.7	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.2	$/sqft	4.2	1.29	0.04

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	15%	10	0.1	$/sqft	4.7	2.26	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-51 Energy Efficiency Non-Equipment Data-Electric Retail, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.48	0.07
Insulation - Ducting	21%	50%	20	0.8	$/sqft	0.8	0.16	0.09
Insulation - Radiant Barrier	7%	13%	20	14,360.4	$/bldg	92,766.4	0.80	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	217,391.3	0.57	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	56.0	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.5	1.20	0.04
Windows - High Efficiency	45%	75%	20	2,181.0	$/bldg	97,788.4	5.77	0.02
Roof - High Reflectivity	58%	95%	15	2,204.0	$/bldg	183,780.8	8.70	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	4%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	843.3	0.93	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586.8	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	3.1	> 10	0.00
Water-Cooled Chiller - Economizer	4%	49%	10	5,493.8	$/sqft	1,826,138.1	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	19.5	2.13	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.34	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	2.89	0.02
Water-Cooled Chiller - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	6.72	0.02
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.6	0.05	0.09
RTU - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	6.93	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.2	0.02	0.09
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	1,440,300.0	1.63	0.00
Gas Boiler - Maintenance	38%	90%	3	2,039.9	$/bldg	346,700.0	0.19	0.01
Gas Furnace - Maintenance	38%	90%	3	2,057.0	$/bldg	27,100.0	0.01	0.07
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	7.0	> 10	0.00
Heat Pump - Maintenance	4%	95%	18	3,921.2	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.7	2.99	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.1	> 10	0.01

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Ventilation - CO2 Controlled	1%	15%	15	0.2	$/sqft	7.1	2.43	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.1	0.41	0.02
Water Heater - Faucet Aerators	23%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	0%	0%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.2	0.06	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.7	1.08	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	17.6	> 10	0.00
Water Heater - Install Timer	10%	50%	15	0.3	$/sqft	2.0	0.31	0.06
Water Heater - Pipe Insulation	10%	50%	12	3,001.4	$/bldg	35,750.0	0.66	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	1.2	1.07	0.02
Water Heater - Pre-Rinse Spray Valve	23%	5%	5	100.0	$/sqft	14,822.0	6.43	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	15.9	0.17	0.04
Interior Lighting - Daylighting Controls	14%	50%	8	0.1	$/sqft	3.7	1.22	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	4%	56%	8	0.1	$/sqft	1.2	0.64	0.04
Interior Lighting - Task Lighting	12%	75%	5	0.2	$/sqft	1.3	0.08	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.6	0.11	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.0	0.15	0.11
Interior Fluorescent - Delamp and Install Reflectors	10%	30%	11	0.5	$/sqft	1.0	0.12	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.03	0.14
Exterior Lighting - Daylighting Controls	17%	38%	8	0.0	$/sqft	0.8	0.69	0.02
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.9	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.52	0.02
Refrigerator - Auto Door Closer	0%	75%	8	168.8	$/bldg	18,519.4	3.58	0.01
Refrigerator - Decommissioning	50%	0%	8	0.1	$/sqft	5.9	1.38	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.4	0.17	0.09
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.11	0.11
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.52	0.04
Refrigerator - Floating Head Pressure	18%	38%	16	0.4	$/sqft	-	0.00	-
Refrigerator - Strip Curtain	5%	56%	6	408.8	$/sqft	4,809.3	0.31	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.02	0.11

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Vending Machine - Controller	2%	10%	5	180.0	$/sqft	18,382.6	1.38	0.01
Grocery - Display Case - LED Lighting	0%	0%	8	378.0	$/sqft	22,291.7	1.57	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	0.9	0.01	0.17
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	6.84	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.1	0.07	0.13
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.51	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	7%	56%	5	7,190.6	$/bldg	37,713.8	0.09	0.12
Pool Pump - Timer	0%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	-	0.00	-
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	8%	75%	15	41,951.5	$/bldg	899,536.2	1.52	0.03
Thermostat - Clock/Programmable	44%	50%	11	1,239.8	$/bldg	9,105.8	0.65	0.07
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.57	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	1.0	0.64	0.08
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	4.4	1.56	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	5.5	2.15	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	4.4	0.78	0.06
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	5.5	1.07	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	11.8	2.92	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.94	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.5	3.61	0.01
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	1.98	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.2	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.5	0.38	0.09
Water Heating - Booster Water Heater	10%	50%	20	0.0	$/sqft	0.7	9.29	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	3.2	> 10	0.00
Boiler O2 Trim Controls	4%	49%	15	0.0	$/sqft	1.1	0.76	0.01
Boiler Parallel Positioning Control	4%	49%	15	0.2	$/sqft	1.1	0.05	0.07
Boiler blowdown heat exchanger (steam)	4%	49%	20	0.7	$/sqft	3.0	0.05	0.07
Repair malfunctioning steam traps	38%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	10%	50%	12	1,302.0	$/bldg	1.1	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.2	$/sqft	6.2	0.16	0.03

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Exhaust Hood Makeup Air	1%	15%	10	0.1	$/sqft	6.9	0.28	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-52 Energy Efficiency Non-Equipment Data-Natural Gas Retail, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.71	0.07
Insulation - Ducting	21%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Radiant Barrier	7%	13%	20	14,360.4	$/bldg	92,766.4	1.18	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	217,391.3	0.82	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	56.0	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.5	1.37	0.04
Windows - High Efficiency	45%	75%	20	2,181.0	$/bldg	97,788.4	7.59	0.02
Roof - High Reflectivity	58%	95%	15	2,204.0	$/bldg	183,780.8	> 10	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	0%	0%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	4%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	0%	0%	15	2,114.1	$/bldg	843.3	0.93	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586.8	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	3.1	> 10	0.00
Water-Cooled Chiller - Economizer	4%	49%	10	5,493.8	$/sqft	1,826,138.1	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	19.5	2.78	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	0%	0%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	0%	0%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Water-Cooled Chiller - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.6	0.06	0.09
RTU - Maintenance	45%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	2.2	0.25	0.09
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	1,440,300.0	> 10	0.00
Gas Boiler - Maintenance	38%	90%	3	2,039.9	$/bldg	346,700.0	2.12	0.01
Gas Furnace - Maintenance	38%	90%	3	2,057.0	$/bldg	27,100.0	0.18	0.07
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	7.0	> 10	0.00
Heat Pump - Maintenance	4%	95%	18	3,921.2	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.7	3.05	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.1	> 10	0.01