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	2.1	1.15	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	0.15	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.7	2.72	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	0.70	0.06
Water Heater - Pipe Insulation	10%	50%	12	3,001.4	$/bldg	35,750.0	0.88	0.05
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	1.2	2.94	0.02
Water Heater - Pre-Rinse Spray Valve	23%	5%	5	100.0	$/sqft	14,822.0	7.53	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	15.9	1.72	0.04
Interior Lighting - Daylighting Controls	14%	50%	8	0.1	$/sqft	3.7	1.58	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	0.83	0.04
Interior Lighting - Task Lighting	12%	75%	5	0.2	$/sqft	1.3	0.12	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.6	0.14	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.0	0.19	0.11
Interior Fluorescent - Delamp and Install Reflectors	10%	30%	11	0.5	$/sqft	1.0	0.15	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	17%	38%	8	0.0	$/sqft	0.8	1.26	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%	0%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.4	0.23	0.09
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.12	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	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	0.9	0.01	0.17
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	0.1	0.08	0.13
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	8%	75%	15	41,951.5	$/bldg	899,536.2	1.90	0.03
Thermostat - Clock/Programmable	44%	50%	11	1,239.8	$/bldg	9,105.8	0.81	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	1.0	0.77	0.08
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	4.4	2.00	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	5.5	2.67	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	4.4	1.00	0.06
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	5.5	1.33	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	11.8	3.76	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.06	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.5	4.72	0.01
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	2.25	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	0.49	0.09
Water Heating - Booster Water Heater	10%	50%	20	0.0	$/sqft	0.7	9.51	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	7.62	0.01
Boiler Parallel Positioning Control	4%	49%	15	0.2	$/sqft	1.1	0.53	0.07
Boiler blowdown heat exchanger (steam)	4%	49%	20	0.7	$/sqft	3.0	0.55	0.07
Repair malfunctioning steam traps	38%	90%	6	77.0	$/sqft	13,880.0	4.93	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	1.64	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	2.88	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-53 Energy Efficiency Non-Equipment Data-Electric Retail, 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	7%	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	3.6	1.56	0.03
Windows - High Efficiency	73%	75%	20	2,181.0	$/bldg	118,047.2	6.46	0.02
Roof - High Reflectivity	64%	95%	15	2,204.0	$/bldg	73,416.6	5.77	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	1,253.6	0.76	0.11
Air-Cooled Chiller - Chilled Water Reset	10%	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	45%	90%	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	2.0	> 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	15.8	2.25	0.04
Water-Cooled Chiller - Chilled Water Reset	10%	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	45%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.2	0.05	0.09
RTU - Maintenance	45%	90%	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	1.6	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	36%	90%	3	2,039.9	$/bldg	228,900.0	0.13	0.01
Gas Furnace - Maintenance	36%	90%	3	2,057.0	$/bldg	47,400.0	0.03	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	12.0	> 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	3.7	3.02	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	12%	15%	15	0.2	$/sqft	7.1	2.48	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.0	0.39	0.02
Water Heater - Faucet Aerators	36%	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	1.1	0.06	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.4	1.04	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	16.6	> 10	0.00
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	1.9	0.30	0.06
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	1.1	1.03	0.02
Water Heater - Pre-Rinse Spray Valve	36%	5%	5	100.0	$/sqft	14,822.0	6.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	12.0	0.12	0.04
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	3.7	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	1.2	0.80	0.04
Interior Lighting - Task Lighting	18%	75%	5	0.2	$/sqft	1.3	0.12	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.6	0.14	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.0	0.18	0.11
Interior Fluorescent - Delamp and Install Reflectors	9%	30%	11	0.5	$/sqft	1.0	0.15	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	17%	38%	8	0.0	$/sqft	0.8	1.19	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	1.89	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	1.67	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.2	0.09	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.12	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	1.92	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	1.42	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	0.9	0.01	0.17
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	0.1	0.08	0.13
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	0.09	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%	75%	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	2.78	0.03
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	6.99	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.8	0.60	0.09
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	3.5	1.57	0.05
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	5.5	2.59	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	3.5	0.78	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	5.5	1.30	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	9.3	2.95	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.26	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.5	4.47	0.01
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	2.09	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.2	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.2	1.63	0.07
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	0.6	9.01	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	3.2	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.8	0.57	0.01
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.8	0.04	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	2.2	0.04	0.07
Repair malfunctioning steam traps	36%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.8	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.2	$/sqft	7.4	0.19	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	8.3	0.33	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-54 Energy Efficiency Non-Equipment Data-Natural Gas Retail, 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	7%	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	3.6	1.56	0.03
Windows - High Efficiency	73%	75%	20	2,181.0	$/bldg	118,047.2	8.36	0.02
Roof - High Reflectivity	64%	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	1,253.6	0.76	0.11
Air-Cooled Chiller - Chilled Water Reset	10%	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	45%	90%	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	2.0	> 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	15.8	2.25	0.04
Water-Cooled Chiller - Chilled Water Reset	10%	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	45%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	13%	20	3.0	$/sqft	1.2	0.05	0.09
RTU - Maintenance	45%	90%	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	1.6	0.21	0.10
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	978,400.0	> 10	0.00
Gas Boiler - Maintenance	36%	90%	3	2,039.9	$/bldg	228,900.0	1.56	0.01
Gas Furnace - Maintenance	36%	90%	3	2,057.0	$/bldg	47,400.0	0.32	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.0	$/sqft	12.0	> 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	3.7	3.01	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	12%	15%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.0	1.11	0.02
Water Heater - Faucet Aerators	36%	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	1.1	0.15	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.4	2.63	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	16.6	> 10	0.00
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	1.9	0.68	0.06
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	1.1	2.86	0.02
Water Heater - Pre-Rinse Spray Valve	36%	5%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	12.0	1.41	0.04
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	3.7	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	1.2	0.83	0.04
Interior Lighting - Task Lighting	18%	75%	5	0.2	$/sqft	1.3	0.12	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.6	0.14	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.0	0.19	0.11
Interior Fluorescent - Delamp and Install Reflectors	9%	30%	11	0.5	$/sqft	1.0	0.15	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.14
Exterior Lighting - Daylighting Controls	17%	38%	8	0.0	$/sqft	0.8	1.26	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%	0%	8	0.1	$/sqft	5.9	1.75	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.2	0.10	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.12	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	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	0.9	0.01	0.17
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	0.1	0.08	0.13
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%	75%	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	2.81	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	0.8	0.61	0.09
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	3.5	1.58	0.05
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	5.5	2.67	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	3.5	0.79	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	5.5	1.33	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	9.3	2.98	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.97	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.5	4.70	0.01
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	2.25	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.2	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.2	1.64	0.07
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	0.6	8.97	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	3.2	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.8	6.47	0.01
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.8	0.45	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	2.2	0.46	0.07
Repair malfunctioning steam traps	36%	90%	6	77.0	$/sqft	13,880.0	5.51	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.8	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.2	$/sqft	7.4	2.22	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	8.3	3.88	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-55 Energy Efficiency Non-Equipment Data-Electric Grocery, 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	30,233.0	$/bldg	145,758.9	0.73	0.07
Insulation - Ducting	33%	50%	20	0.8	$/sqft	0.1	0.06	0.10
Insulation - Radiant Barrier	0%	13%	20	7,725.0	$/bldg	58,780.1	1.23	0.06
Insulation - Wall Cavity	7%	13%	20	17,381.7	$/bldg	247,363.2	1.45	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	31.7	$/bldg	17,061.4	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	4.0	3.82	0.03
Windows - High Efficiency	33%	75%	20	4,270.6	$/bldg	248,694.7	6.96	0.01
Roof - High Reflectivity	67%	95%	15	1,185.6	$/bldg	41,221.3	7.82	0.02
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	31,181.0	1.65	0.02
Air-Cooled Chiller - VSD on fans	0%	0%	15	1,196.5	$/bldg	433.1	2.89	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	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	6.6	> 10	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	81.4	$/sqft	31,181.0	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	26.7	> 10	0.03
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	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
RTU - Evaporative Precooler	0%	18%	20	3.0	$/sqft	3.4	0.11	0.09
RTU - Maintenance	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	1.9	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	22%	90%	3	2,039.9	$/bldg	346,700.0	0.19	0.01
Gas Furnace - Maintenance	22%	90%	3	1,074.1	$/bldg	27,100.0	0.03	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.1	$/sqft	8.3	9.13	0.01
Heat Pump - Maintenance	0%	95%	18	2,219.3	$/bldg	562,750.4	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.6	4.85	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.1	$/sqft	4.3	5.31	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	1.93	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.8	1.19	0.01
Water Heater - Faucet Aerators	22%	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	2.1	0.20	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	8.3	3.28	0.00
Water Heater - Solar System	0%	25%	20	0.2	$/sqft	31.3	> 10	0.01
Water Heater - Install Timer	22%	50%	15	0.3	$/sqft	3.5	0.99	0.05
Water Heater - Pipe Insulation	22%	50%	12	1,556.6	$/bldg	69,027.5	2.63	0.02
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	2.1	3.12	0.01
Water Heater - Pre-Rinse Spray Valve	22%	5%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	13.8	0.14	0.04
Interior Lighting - Daylighting Controls	22%	50%	8	0.1	$/sqft	8.3	3.30	0.01
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	2.8	1.73	0.02
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	2.9	0.17	0.07
Interior Lighting - Timeclocks and Timers	11%	56%	8	0.2	$/sqft	1.4	0.30	0.08
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	6.4	0.57	0.06
Interior Fluorescent - Delamp and Install Reflectors	44%	49%	11	0.5	$/sqft	2.3	0.33	0.09
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.2	0.02	0.15
Exterior Lighting - Daylighting Controls	31%	38%	8	0.0	$/sqft	0.6	0.55	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.7	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	75%	12	250.0	$/sqft	8,953.8	1.54	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	1.39	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	3.8	1.52	0.04
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	9.4	2.25	0.01
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	10.2	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.56	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	12%	56%	8	378.0	$/sqft	22,291.7	1.57	0.02
Grocery - Display Case Motion Sensors	12%	56%	8	2.0	$/sqft	34.3	0.45	0.04
Grocery - ECMs for Display Cases	12%	56%	15	50.0	$/sqft	4,570.0	6.84	0.01
Grocery - Open Display Case - Night Covers	5%	75%	8	0.1	$/sqft	4.6	2.51	0.01
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	2.79	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	1,934.0	$/bldg	9,072.8	0.08	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	0%	50%	15	11,283.6	$/bldg	899,536.2	5.66	0.01
Thermostat - Clock/Programmable	33%	50%	11	333.5	$/bldg	28,730.7	> 10	0.01
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	1.8	2.67	0.05
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	7.9	2.80	0.03
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	12.4	4.97	0.00
Retrocommissioning - HVAC	5%	24%	25	0.8	$/sqft	7.9	1.40	0.05
Retrocommissioning - Lighting	56%	61%	5	0.1	$/sqft	12.4	2.49	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	21.1	> 10	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	3.34	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	10.6	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	1.79	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	2.6	1.65	0.08
Water Heating - Booster Water Heater	22%	50%	20	0.0	$/sqft	2.2	8.70	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	42.6	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	0.9	0.18	0.03
Boiler Parallel Positioning Control	0%	49%	15	0.7	$/sqft	0.9	0.01	0.10
Boiler blowdown heat exchanger (steam)	0%	49%	20	2.7	$/sqft	2.6	0.01	0.09
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	22%	50%	12	1,302.0	$/bldg	0.9	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.9	$/sqft	5.4	0.04	0.07

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	0.4	$/sqft	6.0	0.07	0.05
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-56 Energy Efficiency Non-Equipment Data-Natural Gas Grocery, 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	30,233.0	$/bldg	145,758.9	1.00	0.07
Insulation - Ducting	33%	50%	20	0.8	$/sqft	0.1	0.07	0.10
Insulation - Radiant Barrier	0%	13%	20	7,725.0	$/bldg	58,780.1	1.69	0.06
Insulation - Wall Cavity	7%	13%	20	17,381.7	$/bldg	247,363.2	2.05	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	31.7	$/bldg	17,061.4	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	4.0	4.59	0.03
Windows - High Efficiency	33%	75%	20	4,270.6	$/bldg	248,694.7	8.75	0.01
Roof - High Reflectivity	67%	95%	15	1,185.6	$/bldg	41,221.3	9.87	0.02
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	31,181.0	1.65	0.02
Air-Cooled Chiller - VSD on fans	0%	0%	15	1,196.5	$/bldg	433.1	2.89	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	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	6.6	> 10	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	81.4	$/sqft	31,181.0	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	26.7	> 10	0.03
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	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
RTU - Evaporative Precooler	0%	18%	20	3.0	$/sqft	3.4	0.14	0.09
RTU - Maintenance	33%	90%	18	3,334.5	$/bldg	551,969.2	> 10	0.01
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	1.9	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	22%	90%	3	2,039.9	$/bldg	346,700.0	2.36	0.01
Gas Furnace - Maintenance	22%	90%	3	1,074.1	$/bldg	27,100.0	0.35	0.04
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.1	$/sqft	8.3	> 10	0.01
Heat Pump - Maintenance	0%	95%	18	2,219.3	$/bldg	562,750.4	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.6	6.27	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.1	$/sqft	4.3	6.81	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	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.8	1.88	0.01
Water Heater - Faucet Aerators	22%	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	2.1	0.28	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	8.3	4.83	0.00
Water Heater - Solar System	0%	25%	20	0.2	$/sqft	31.3	> 10	0.01
Water Heater - Install Timer	22%	50%	15	0.3	$/sqft	3.5	1.36	0.05
Water Heater - Pipe Insulation	22%	50%	12	1,556.6	$/bldg	69,027.5	3.37	0.02
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	2.1	4.87	0.01
Water Heater - Pre-Rinse Spray Valve	22%	5%	5	100.0	$/sqft	14,822.0	7.53	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	13.8	1.59	0.04
Interior Lighting - Daylighting Controls	22%	50%	8	0.1	$/sqft	8.3	4.14	0.01
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	2.8	2.17	0.02
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	2.9	0.31	0.07
Interior Lighting - Timeclocks and Timers	11%	56%	8	0.2	$/sqft	1.4	0.38	0.08
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	6.4	0.70	0.06
Interior Fluorescent - Delamp and Install Reflectors	44%	49%	11	0.5	$/sqft	2.3	0.41	0.09
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.2	0.04	0.15
Exterior Lighting - Daylighting Controls	31%	38%	8	0.0	$/sqft	0.6	0.99	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.7	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	75%	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	3.8	1.97	0.04
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	9.4	3.05	0.01
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	10.2	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	12%	56%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	12%	56%	8	2.0	$/sqft	34.3	0.56	0.04
Grocery - ECMs for Display Cases	12%	56%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	5%	75%	8	0.1	$/sqft	4.6	3.02	0.01
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	1,934.0	$/bldg	9,072.8	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	0%	50%	15	11,283.6	$/bldg	899,536.2	7.07	0.01
Thermostat - Clock/Programmable	33%	50%	11	333.5	$/bldg	28,730.7	> 10	0.01
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	1.8	3.21	0.05
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	7.9	3.58	0.03
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	12.4	6.01	0.00
Retrocommissioning - HVAC	5%	24%	25	0.8	$/sqft	7.9	1.79	0.05
Retrocommissioning - Lighting	56%	61%	5	0.1	$/sqft	12.4	3.00	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	21.1	> 10	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	3.82	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	10.6	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	2.01	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	2.6	2.11	0.08
Water Heating - Booster Water Heater	22%	50%	20	0.0	$/sqft	2.2	8.79	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	42.6	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	0.9	2.01	0.03
Boiler Parallel Positioning Control	0%	49%	15	0.7	$/sqft	0.9	0.14	0.10
Boiler blowdown heat exchanger (steam)	0%	49%	20	2.7	$/sqft	2.6	0.14	0.09
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	5.51	0.01
Insulate steam lines/condensate tank	22%	50%	12	1,302.0	$/bldg	0.9	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.9	$/sqft	5.4	0.44	0.07

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	0.4	$/sqft	6.0	0.76	0.05
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-57 Energy Efficiency Non-Equipment Data-Electric Grocery, 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	30,233.0	$/bldg	86,078.5	0.38	0.08
Insulation - Ducting	33%	50%	20	0.8	$/sqft	0.1	0.05	0.10
Insulation - Radiant Barrier	0%	13%	20	7,725.0	$/bldg	28,949.4	0.49	0.07
Insulation - Wall Cavity	7%	13%	20	17,381.7	$/bldg	105,885.0	0.67	0.06
HVAC - Duct Repair and Sealing	25%	25%	18	31.7	$/bldg	14,764.5	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	3.4	3.65	0.03
Windows - High Efficiency	33%	75%	20	4,270.6	$/bldg	159,094.5	4.38	0.02
Roof - High Reflectivity	67%	95%	15	1,185.6	$/bldg	21,573.7	4.26	0.04
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	25,163.6	1.33	0.03
Air-Cooled Chiller - VSD on fans	0%	0%	15	1,196.5	$/bldg	1,287.8	2.62	0.10
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	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	4.1	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	25,163.6	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	21.7	9.26	0.04
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	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
RTU - Evaporative Precooler	0%	14%	20	3.0	$/sqft	2.5	0.10	0.09
RTU - Maintenance	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	1.2	0.01	0.11
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	978,400.0	1.11	0.00
Gas Boiler - Maintenance	22%	90%	3	2,039.9	$/bldg	228,900.0	0.13	0.01
Gas Furnace - Maintenance	22%	90%	3	1,074.1	$/bldg	47,400.0	0.05	0.02
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.1	$/sqft	5.9	6.30	0.01
Heat Pump - Maintenance	0%	95%	18	2,219.3	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	11.5	9.13	0.01
Ventilation - Variable Speed Control	0%	81%	15	0.1	$/sqft	6.6	9.95	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	12%	15%	15	0.2	$/sqft	7.1	2.39	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.6	1.14	0.01
Water Heater - Faucet Aerators	22%	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	2.0	0.20	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	7.9	3.14	0.00
Water Heater - Solar System	0%	25%	20	0.2	$/sqft	29.7	> 10	0.01
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	3.4	0.95	0.05
Water Heater - Pipe Insulation	50%	50%	12	1,556.6	$/bldg	69,079.0	2.63	0.02
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	2.0	2.99	0.01
Water Heater - Pre-Rinse Spray Valve	22%	5%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	8.5	0.09	0.05
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	8.2	3.95	0.01
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	2.7	2.07	0.02
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	2.8	0.29	0.07
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	1.4	0.36	0.08
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	6.3	0.68	0.06
Interior Fluorescent - Delamp and Install Reflectors	44%	49%	11	0.5	$/sqft	2.3	0.39	0.09
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.2	0.04	0.15
Exterior Lighting - Daylighting Controls	31%	38%	8	0.0	$/sqft	0.6	0.97	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.7	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	75%	12	250.0	$/sqft	8,953.8	1.94	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	1.71	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	1.6	0.83	0.06
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	9.4	2.99	0.01
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	10.2	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.97	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	1.42	0.01
Grocery - Display Case - LED Lighting	12%	56%	8	378.0	$/sqft	22,291.7	1.89	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	34.3	0.55	0.04
Grocery - ECMs for Display Cases	12%	56%	15	50.0	$/sqft	4,570.0	8.50	0.01
Grocery - Open Display Case - Night Covers	5%	75%	8	0.1	$/sqft	4.6	2.97	0.01
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.45	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	1,934.0	$/bldg	9,072.8	0.08	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	11,283.6	$/bldg	531,443.5	3.68	0.02
Thermostat - Clock/Programmable	50%	50%	11	333.5	$/bldg	11,362.4	7.71	0.02
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	1.4	2.50	0.07
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	6.2	2.77	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	12.3	5.76	0.00
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	6.2	1.39	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	12.3	2.88	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	16.5	> 10	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	3.66	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	10.6	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	1.88	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.2	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	2.1	6.93	0.06
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	2.1	8.35	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	42.6	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.6	0.11	0.05
Boiler Parallel Positioning Control	37%	49%	15	0.7	$/sqft	0.6	0.01	0.10
Boiler blowdown heat exchanger (steam)	37%	49%	20	2.7	$/sqft	1.6	0.01	0.09
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.6	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.9	$/sqft	4.0	0.03	0.08

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	0.4	$/sqft	4.5	0.05	0.06
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-58 Energy Efficiency Non-Equipment Data-Natural Gas Grocery, 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	30,233.0	$/bldg	86,078.5	0.49	0.08
Insulation - Ducting	33%	50%	20	0.8	$/sqft	0.1	0.05	0.10
Insulation - Radiant Barrier	0%	13%	20	7,725.0	$/bldg	28,949.4	0.63	0.07
Insulation - Wall Cavity	7%	13%	20	17,381.7	$/bldg	105,885.0	0.87	0.06
HVAC - Duct Repair and Sealing	25%	25%	18	31.7	$/bldg	14,764.5	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	3.4	3.67	0.03
Windows - High Efficiency	33%	75%	20	4,270.6	$/bldg	159,094.5	4.86	0.02
Roof - High Reflectivity	67%	95%	15	1,185.6	$/bldg	21,573.7	4.28	0.04
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	25,163.6	1.33	0.03
Air-Cooled Chiller - VSD on fans	0%	0%	15	1,196.5	$/bldg	1,287.8	2.62	0.10
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	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
Water-Cooled Chiller - Condenser Water Temperature Reset	0%	0%	4	0.0	$/sqft	4.1	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	25,163.6	> 10	0.00
Water-Cooled Chiller - VSD on Fans	0%	0%	15	1.2	$/bldg	21.7	9.26	0.04
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	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
RTU - Evaporative Precooler	0%	14%	20	3.0	$/sqft	2.5	0.10	0.09
RTU - Maintenance	33%	90%	18	3,334.5	$/bldg	372,336.8	> 10	0.01
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	1.2	0.15	0.11
Gas Boiler - Hot Water Reset	0%	0%	3	992.7	$/sqft	978,400.0	> 10	0.00
Gas Boiler - Maintenance	22%	90%	3	2,039.9	$/bldg	228,900.0	1.56	0.01
Gas Furnace - Maintenance	22%	90%	3	1,074.1	$/bldg	47,400.0	0.61	0.02
Space Heating - Heat Recovery Ventilator	45%	49%	15	0.1	$/sqft	5.9	9.39	0.01
Heat Pump - Maintenance	0%	95%	18	2,219.3	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	11.5	9.50	0.01
Ventilation - Variable Speed Control	0%	81%	15	0.1	$/sqft	6.6	> 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	12%	15%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.6	1.81	0.01
Water Heater - Faucet Aerators	22%	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	2.0	0.27	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	7.9	4.65	0.00
Water Heater - Solar System	0%	25%	20	0.2	$/sqft	29.7	> 10	0.01
Water Heater - Install Timer	50%	50%	15	0.3	$/sqft	3.4	1.31	0.05
Water Heater - Pipe Insulation	50%	50%	12	1,556.6	$/bldg	69,079.0	3.43	0.02
Water Heater - Tank Blanket/Insulation	40%	50%	10	0.0	$/sqft	2.0	4.72	0.01
Water Heater - Pre-Rinse Spray Valve	22%	5%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	8.5	1.00	0.05
Interior Lighting - Daylighting Controls	75%	75%	8	0.1	$/sqft	8.2	4.10	0.01
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	2.7	2.15	0.02
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	2.8	0.31	0.07
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	1.4	0.38	0.08
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	6.3	0.70	0.06
Interior Fluorescent - Delamp and Install Reflectors	44%	49%	11	0.5	$/sqft	2.3	0.41	0.09
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.2	0.04	0.15
Exterior Lighting - Daylighting Controls	31%	38%	8	0.0	$/sqft	0.6	0.98	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.7	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	75%	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	1.6	0.86	0.06
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	9.4	3.05	0.01
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	10.2	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	12%	56%	8	378.0	$/sqft	22,291.7	1.92	0.02
Grocery - Display Case Motion Sensors	0%	0%	8	2.0	$/sqft	34.3	0.56	0.04
Grocery - ECMs for Display Cases	12%	56%	15	50.0	$/sqft	4,570.0	8.65	0.01
Grocery - Open Display Case - Night Covers	5%	75%	8	0.1	$/sqft	4.6	3.02	0.01
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	1,934.0	$/bldg	9,072.8	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	1.60	0.04
Energy Management System	0%	50%	15	11,283.6	$/bldg	531,443.5	3.79	0.02
Thermostat - Clock/Programmable	50%	50%	11	333.5	$/bldg	11,362.4	7.75	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	1.4	2.51	0.07
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	6.2	2.79	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	12.3	5.95	0.00
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	6.2	1.39	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	12.3	2.97	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	16.5	> 10	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	3.34	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	10.6	> 10	0.00
Electronics - Smart Power Strip	7%	56%	7	0.0	$/sqft	0.0	2.01	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.2	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	2.1	6.96	0.06
Water Heating - Booster Water Heater	50%	50%	20	0.0	$/sqft	2.1	8.35	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.1	$/sqft	42.6	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.6	1.23	0.05
Boiler Parallel Positioning Control	37%	49%	15	0.7	$/sqft	0.6	0.09	0.10
Boiler blowdown heat exchanger (steam)	37%	49%	20	2.7	$/sqft	1.6	0.09	0.09
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	5.51	0.01
Insulate steam lines/condensate tank	50%	50%	12	1,302.0	$/bldg	0.6	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.9	$/sqft	4.0	0.32	0.08

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	0.4	$/sqft	4.5	0.57	0.06
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-59 Energy Efficiency Non-Equipment Data-Electric College, 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	2%	13%	20	84,147.3	$/bldg	761,541.5	0.96	0.05
Insulation - Ducting	56%	61%	20	0.8	$/sqft	1.3	0.61	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	289,637.8	1.42	0.04
Insulation - Wall Cavity	2%	13%	20	19,567.9	$/bldg	318,121.5	1.47	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	123.6	$/bldg	75,034.9	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	4.1	1.67	0.03
Windows - High Efficiency	44%	100%	20	11,849.0	$/bldg	526,064.9	7.84	0.02
Roof - High Reflectivity	22%	95%	15	3,299.9	$/bldg	119,276.3	5.95	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Air-Cooled Chiller - Economizer	11%	81%	10	813.6	$/sqft	20,889.9	1.02	0.03
Air-Cooled Chiller - VSD on fans	3%	75%	15	4,665.3	$/bldg	2,894.7	0.15	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	3.40	0.02
Air-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	5.2	> 10	0.00
Water-Cooled Chiller - Economizer	11%	81%	10	81.4	$/sqft	20,889.9	8.94	0.00
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	18.7	2.16	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	2.91	0.02
Water-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
RTU - Evaporative Precooler	0%	5%	20	3.0	$/sqft	1.2	0.04	0.09
RTU - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.8	0.02	0.09
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,758,300.0	1.99	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	1,181,200.0	0.65	0.00
Gas Furnace - Maintenance	0%	90%	3	5,291.5	$/bldg	749,700.0	0.16	0.01
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	12.1	> 10	0.00
Heat Pump - Maintenance	33%	95%	18	8,653.1	$/bldg	1,048,699.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.5	2.09	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.0	6.35	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%	8%	15	0.2	$/sqft	7.1	1.81	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.6	0.85	0.01
Water Heater - Faucet Aerators	56%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	56%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.0	0.14	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	8.0	2.34	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	29.8	> 10	0.00
Water Heater - Install Timer	44%	49%	15	0.3	$/sqft	3.4	0.70	0.05
Water Heater - Pipe Insulation	44%	49%	12	2,596.9	$/bldg	52,997.6	1.10	0.04
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.0	2.22	0.01
Water Heater - Pre-Rinse Spray Valve	56%	5%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	13.3	0.14	0.04
Interior Lighting - Daylighting Controls	0%	10%	8	0.1	$/sqft	4.2	1.69	0.02
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	11%	56%	8	0.1	$/sqft	1.4	0.89	0.04
Interior Lighting - Task Lighting	11%	75%	5	0.2	$/sqft	1.5	0.14	0.11
Interior Lighting - Timeclocks and Timers	0%	56%	8	0.2	$/sqft	0.7	0.16	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.6	0.23	0.09
Interior Fluorescent - Delamp and Install Reflectors	56%	61%	11	0.5	$/sqft	1.2	0.17	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.3	0.36	0.05
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.47	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	1.34	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.1	0.03	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.03	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.47	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	0.17	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	0.3	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%	8%	15	1,494.0	$/bldg	51,124.9	2.61	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	42%	56%	5	5,383.0	$/bldg	54,396.4	0.17	0.07
Pool Pump - Timer	11%	34%	10	100.0	$/bldg	20,513.8	9.00	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	11%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	44%	90%	15	31,405.5	$/bldg	1,396,350.3	2.71	0.02
Thermostat - Clock/Programmable	44%	50%	11	928.1	$/bldg	248,159.9	> 10	0.00
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.68	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	1.0	0.68	0.08
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	4.6	1.64	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	6.3	2.76	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	4.6	0.82	0.06
Retrocommissioning - Lighting	67%	72%	5	0.1	$/sqft	6.3	1.38	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	12.2	3.13	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.09	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.03	0.03
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	4.03	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.6	> 10	0.00
Insulation - Foundation	2%	13%	20	1.4	$/sqft	1.5	0.41	0.09
Water Heating - Booster Water Heater	44%	49%	20	0.0	$/sqft	1.5	> 10	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.2	> 10	0.00
Boiler O2 Trim Controls	11%	81%	15	0.0	$/sqft	0.9	0.47	0.02
Boiler Parallel Positioning Control	11%	81%	15	0.2	$/sqft	0.9	0.03	0.08
Boiler blowdown heat exchanger (steam)	11%	81%	20	1.0	$/sqft	2.5	0.03	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	44%	49%	12	1,302.0	$/bldg	0.9	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	5.8	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%	8%	10	0.2	$/sqft	6.5	0.20	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-60 Energy Efficiency Non-Equipment Data-Natural Gas College, 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	2%	13%	20	84,147.3	$/bldg	761,541.5	1.36	0.05
Insulation - Ducting	56%	61%	20	0.8	$/sqft	1.3	0.77	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	289,637.8	2.03	0.04
Insulation - Wall Cavity	2%	13%	20	19,567.9	$/bldg	318,121.5	2.14	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	123.6	$/bldg	75,034.9	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	4.1	1.86	0.03
Windows - High Efficiency	44%	100%	20	11,849.0	$/bldg	526,064.9	8.98	0.02
Roof - High Reflectivity	22%	95%	15	3,299.9	$/bldg	119,276.3	7.37	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Air-Cooled Chiller - Economizer	11%	81%	10	813.6	$/sqft	20,889.9	1.10	0.03
Air-Cooled Chiller - VSD on fans	3%	75%	15	4,665.3	$/bldg	2,894.7	0.17	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	5.2	> 10	0.00
Water-Cooled Chiller - Economizer	11%	81%	10	81.4	$/sqft	20,889.9	> 10	0.00
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	18.7	2.79	0.04
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Water-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
RTU - Evaporative Precooler	0%	5%	20	3.0	$/sqft	1.2	0.05	0.09
RTU - Maintenance	44%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.8	0.19	0.09
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,758,300.0	> 10	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	1,181,200.0	6.74	0.00
Gas Furnace - Maintenance	0%	90%	3	5,291.5	$/bldg	749,700.0	1.95	0.01
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	12.1	> 10	0.00
Heat Pump - Maintenance	33%	95%	18	8,653.1	$/bldg	1,048,699.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.5	2.89	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.0	8.73	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%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.6	1.90	0.01
Water Heater - Faucet Aerators	56%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	56%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.0	0.27	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	8.0	4.68	0.00
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	29.8	> 10	0.00
Water Heater - Install Timer	44%	49%	15	0.3	$/sqft	3.4	1.26	0.05
Water Heater - Pipe Insulation	44%	49%	12	2,596.9	$/bldg	52,997.6	1.46	0.04
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.0	4.89	0.01
Water Heater - Pre-Rinse Spray Valve	56%	5%	5	100.0	$/sqft	14,822.0	7.54	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	13.3	1.39	0.04
Interior Lighting - Daylighting Controls	0%	10%	8	0.1	$/sqft	4.2	1.92	0.02
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	11%	56%	8	0.1	$/sqft	1.4	1.00	0.04
Interior Lighting - Task Lighting	11%	75%	5	0.2	$/sqft	1.5	0.15	0.11
Interior Lighting - Timeclocks and Timers	0%	56%	8	0.2	$/sqft	0.7	0.18	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.6	0.26	0.09
Interior Fluorescent - Delamp and Install Reflectors	56%	61%	11	0.5	$/sqft	1.2	0.19	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.02	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.3	0.46	0.05
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	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	0.1	0.05	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	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	0.01	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%	8%	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	42%	56%	5	5,383.0	$/bldg	54,396.4	0.18	0.07
Pool Pump - Timer	11%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	11%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	44%	90%	15	31,405.5	$/bldg	1,396,350.3	3.54	0.02
Thermostat - Clock/Programmable	44%	50%	11	928.1	$/bldg	248,159.9	> 10	0.00
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	1.0	0.81	0.08
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	4.6	2.06	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	6.3	3.06	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	4.6	1.03	0.06
Retrocommissioning - Lighting	67%	72%	5	0.1	$/sqft	6.3	1.53	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	12.2	3.95	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.08	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.38	0.03
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	4.34	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.6	> 10	0.00
Insulation - Foundation	2%	13%	20	1.4	$/sqft	1.5	0.51	0.09
Water Heating - Booster Water Heater	44%	49%	20	0.0	$/sqft	1.5	> 10	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.2	> 10	0.00
Boiler O2 Trim Controls	11%	81%	15	0.0	$/sqft	0.9	4.43	0.02
Boiler Parallel Positioning Control	11%	81%	15	0.2	$/sqft	0.9	0.31	0.08
Boiler blowdown heat exchanger (steam)	11%	81%	20	1.0	$/sqft	2.5	0.32	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	4.59	0.01
Insulate steam lines/condensate tank	44%	49%	12	1,302.0	$/bldg	0.9	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	5.8	1.08	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%	8%	10	0.2	$/sqft	6.5	1.89	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-61 Energy Efficiency Non-Equipment Data-Electric College 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	2%	13%	20	84,147.3	$/bldg	590,983.9	0.79	0.06
Insulation - Ducting	56%	61%	20	0.8	$/sqft	1.2	0.71	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	192,618.5	1.02	0.05
Insulation - Wall Cavity	2%	13%	20	19,567.9	$/bldg	155,732.6	0.76	0.05
HVAC - Duct Repair and Sealing	25%	25%	18	123.6	$/bldg	78,624.8	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	4.0	1.79	0.03
Windows - High Efficiency	44%	100%	20	11,849.0	$/bldg	136,952.4	4.21	0.05
Roof - High Reflectivity	22%	95%	15	3,299.9	$/bldg	94,055.8	6.12	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Air-Cooled Chiller - Economizer	64%	81%	10	813.6	$/sqft	15,579.1	0.84	0.04
Air-Cooled Chiller - VSD on fans	3%	75%	15	4,665.3	$/bldg	1,846.2	0.28	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.97	0.05
Air-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	4.4	> 10	0.00
Water-Cooled Chiller - Economizer	64%	81%	10	81.4	$/sqft	15,579.1	8.23	0.01
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	15.0	2.23	0.05
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.4	0.02	0.10
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,285,100.0	1.45	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	1,015,500.0	0.56	0.00
Gas Furnace - Maintenance	0%	90%	3	5,291.5	$/bldg	816,000.0	0.17	0.01
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	11.3	> 10	0.00
Heat Pump - Maintenance	33%	95%	18	8,653.1	$/bldg	1,022,510.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	5.6	4.57	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	3.2	> 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	6%	8%	15	0.2	$/sqft	7.1	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.4	0.81	0.01
Water Heater - Faucet Aerators	56%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	56%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.9	0.14	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	7.5	2.23	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	28.2	> 10	0.00
Water Heater - Install Timer	49%	49%	15	0.3	$/sqft	3.2	0.67	0.05
Water Heater - Pipe Insulation	49%	49%	12	2,596.9	$/bldg	59,686.7	1.27	0.03
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.9	2.13	0.01
Water Heater - Pre-Rinse Spray Valve	56%	5%	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	15%	15%	8	0.1	$/sqft	4.2	1.86	0.02
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	1.4	0.98	0.04
Interior Lighting - Task Lighting	11%	75%	5	0.2	$/sqft	1.5	0.14	0.11
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.7	0.17	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.6	0.25	0.09
Interior Fluorescent - Delamp and Install Reflectors	56%	61%	11	0.5	$/sqft	1.2	0.18	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.02	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.3	0.45	0.05
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.88	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	1.66	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.02	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.92	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	0.30	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	1.42	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	0.01	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%	8%	15	1,494.0	$/bldg	51,124.9	3.56	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	42%	56%	5	5,383.0	$/bldg	54,396.4	0.18	0.07
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	11%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	44%	90%	15	31,405.5	$/bldg	2,113,354.0	4.85	0.01
Thermostat - Clock/Programmable	50%	50%	11	928.1	$/bldg	245,367.8	> 10	0.00
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.10	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.9	0.73	0.08
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	4.1	1.86	0.04
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	6.3	2.98	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	4.1	0.93	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	6.3	1.49	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	11.0	3.58	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.36	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.27	0.03
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	4.10	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.6	> 10	0.00
Insulation - Foundation	2%	13%	20	0.3	$/sqft	1.4	1.97	0.07
Water Heating - Booster Water Heater	49%	49%	20	0.0	$/sqft	1.4	> 10	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.2	> 10	0.00
Boiler O2 Trim Controls	64%	81%	15	0.0	$/sqft	0.7	0.37	0.02
Boiler Parallel Positioning Control	64%	81%	15	0.2	$/sqft	0.7	0.03	0.09
Boiler blowdown heat exchanger (steam)	64%	81%	20	1.0	$/sqft	1.9	0.03	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	49%	49%	12	1,302.0	$/bldg	0.7	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	5.1	0.10	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%	8%	10	0.2	$/sqft	5.7	0.17	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-62 Energy Efficiency Non-Equipment Data-Natural Gas College, 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	2%	13%	20	84,147.3	$/bldg	590,983.9	1.07	0.06
Insulation - Ducting	56%	61%	20	0.8	$/sqft	1.2	0.71	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	192,618.5	1.37	0.05
Insulation - Wall Cavity	2%	13%	20	19,567.9	$/bldg	155,732.6	1.08	0.05
HVAC - Duct Repair and Sealing	25%	25%	18	123.6	$/bldg	78,624.8	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	4.0	1.78	0.03
Windows - High Efficiency	44%	100%	20	11,849.0	$/bldg	136,952.4	4.19	0.05
Roof - High Reflectivity	22%	95%	15	3,299.9	$/bldg	94,055.8	6.09	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Air-Cooled Chiller - Economizer	64%	81%	10	813.6	$/sqft	15,579.1	0.82	0.04
Air-Cooled Chiller - VSD on fans	3%	75%	15	4,665.3	$/bldg	1,846.2	0.27	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Air-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	4.4	> 10	0.00
Water-Cooled Chiller - Economizer	64%	81%	10	81.4	$/sqft	15,579.1	8.23	0.01
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	15.0	2.23	0.05
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.93	0.05
Water-Cooled Chiller - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	44%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.4	0.19	0.10
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,285,100.0	> 10	0.00
Gas Boiler - Maintenance	0%	90%	3	2,039.9	$/bldg	1,015,500.0	6.97	0.00
Gas Furnace - Maintenance	0%	90%	3	5,291.5	$/bldg	816,000.0	2.13	0.01
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	11.3	> 10	0.00
Heat Pump - Maintenance	33%	95%	18	8,653.1	$/bldg	1,022,510.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	5.6	4.60	0.02
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	3.2	> 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	6%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	3.4	1.83	0.01
Water Heater - Faucet Aerators	56%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	56%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.9	0.26	0.09
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	7.5	4.51	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	28.2	> 10	0.00
Water Heater - Install Timer	49%	49%	15	0.3	$/sqft	3.2	1.22	0.05
Water Heater - Pipe Insulation	49%	49%	12	2,596.9	$/bldg	59,686.7	1.68	0.03
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.9	4.74	0.01
Water Heater - Pre-Rinse Spray Valve	56%	5%	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	15%	15%	8	0.1	$/sqft	4.2	1.92	0.02
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	1.4	1.01	0.04
Interior Lighting - Task Lighting	11%	75%	5	0.2	$/sqft	1.5	0.15	0.11
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.7	0.18	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.6	0.26	0.09
Interior Fluorescent - Delamp and Install Reflectors	56%	61%	11	0.5	$/sqft	1.2	0.19	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.02	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.3	0.46	0.05
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	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	0.02	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	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	0.01	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%	8%	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	42%	56%	5	5,383.0	$/bldg	54,396.4	0.18	0.07
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	11%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	44%	90%	15	31,405.5	$/bldg	2,113,354.0	6.81	0.01
Thermostat - Clock/Programmable	50%	50%	11	928.1	$/bldg	245,367.8	> 10	0.00
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	0.9	0.73	0.08
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	4.1	1.85	0.04
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	6.3	3.07	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	4.1	0.93	0.06
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	6.3	1.53	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	11.0	3.56	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.03	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.34	0.03
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	4.34	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.6	> 10	0.00
Insulation - Foundation	2%	13%	20	0.3	$/sqft	1.4	1.96	0.07
Water Heating - Booster Water Heater	49%	49%	20	0.0	$/sqft	1.4	> 10	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.2	> 10	0.00
Boiler O2 Trim Controls	64%	81%	15	0.0	$/sqft	0.7	4.26	0.02
Boiler Parallel Positioning Control	64%	81%	15	0.2	$/sqft	0.7	0.29	0.09
Boiler blowdown heat exchanger (steam)	64%	81%	20	1.0	$/sqft	1.9	0.31	0.08
Repair malfunctioning steam traps	0%	90%	6	77.0	$/sqft	13,880.0	5.57	0.01
Insulate steam lines/condensate tank	49%	49%	12	1,302.0	$/bldg	0.7	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	5.1	1.16	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%	8%	10	0.2	$/sqft	5.7	2.03	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-63 Energy Efficiency Non-Equipment Data-Electric School, 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	84,147.3	$/bldg	761,541.5	0.93	0.05
Insulation - Ducting	27%	50%	20	0.8	$/sqft	1.3	0.61	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	289,637.8	1.37	0.04
Insulation - Wall Cavity	7%	13%	20	19,567.9	$/bldg	318,121.5	1.42	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	123.6	$/bldg	75,034.9	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.5	1.55	0.04
Windows - High Efficiency	73%	75%	20	11,849.0	$/bldg	526,064.9	7.71	0.02
Roof - High Reflectivity	50%	75%	15	3,299.9	$/bldg	119,276.3	5.97	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Air-Cooled Chiller - Economizer	4%	49%	10	813.6	$/sqft	20,889.9	1.01	0.03
Air-Cooled Chiller - VSD on fans	15%	66%	15	4,663.7	$/bldg	2,894.7	0.15	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.37	0.02
Air-Cooled Chiller - Maintenance	73%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	4.0	> 10	0.00
Water-Cooled Chiller - Economizer	4%	49%	10	81.4	$/sqft	20,889.9	8.74	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	9.0	1.38	0.06
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	2.85	0.02
Water-Cooled Chiller - Maintenance	73%	90%	18	9,281.0	$/bldg	260,342.9	9.99	0.03
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.0	0.03	0.09
RTU - Maintenance	73%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.8	0.01	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,758,300.0	1.99	0.00
Gas Boiler - Maintenance	35%	90%	3	2,039.9	$/bldg	1,181,200.0	0.65	0.00
Gas Furnace - Maintenance	35%	90%	3	5,289.5	$/bldg	749,700.0	0.16	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	8,650.1	$/bldg	1,048,699.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.2	1.33	0.04
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	1.3	4.06	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)
Ventilation - CO2 Controlled	1%	11%	15	0.2	$/sqft	7.1	1.81	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.1	0.54	0.02
Water Heater - Faucet Aerators	31%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	31%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.2	0.08	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.7	1.34	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	17.8	> 10	0.00
Water Heater - Install Timer	15%	20%	15	0.3	$/sqft	2.0	0.38	0.06
Water Heater - Pipe Insulation	15%	20%	12	2,596.9	$/bldg	52,997.6	1.10	0.04
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.2	1.42	0.02
Water Heater - Pre-Rinse Spray Valve	31%	5%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	6.0	0.06	0.06
Interior Lighting - Daylighting Controls	12%	13%	8	0.1	$/sqft	3.6	1.08	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	15%	56%	8	0.1	$/sqft	1.2	0.57	0.04
Interior Lighting - Task Lighting	4%	75%	5	0.2	$/sqft	1.2	0.06	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.6	0.10	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.4	0.10	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	1.0	0.10	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.2	0.27	0.06
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.43	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	1.31	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.1	0.03	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.04	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.43	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	0.18	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	0.4	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	0.1	0.03	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	2.61	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	5,383.0	$/bldg	30,456.7	0.10	0.11
Pool Pump - Timer	0%	34%	10	100.0	$/bldg	20,513.8	9.00	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	4%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	19%	75%	15	31,405.5	$/bldg	1,396,350.3	2.62	0.02
Thermostat - Clock/Programmable	50%	50%	11	928.1	$/bldg	248,159.9	> 10	0.00
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.70	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.7	0.88	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.2	1.17	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	5.4	2.14	0.01
Retrocommissioning - HVAC	9%	36%	25	0.8	$/sqft	3.2	0.59	0.06
Retrocommissioning - Lighting	31%	36%	5	0.1	$/sqft	5.4	1.07	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	8.7	4.19	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.25	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.13	0.03
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.25	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.1	0.55	0.09
Water Heating - Booster Water Heater	15%	20%	20	0.0	$/sqft	1.0	8.78	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.3	> 10	0.00
Boiler O2 Trim Controls	4%	49%	15	0.0	$/sqft	0.4	0.21	0.03
Boiler Parallel Positioning Control	4%	49%	15	0.2	$/sqft	0.4	0.01	0.10
Boiler blowdown heat exchanger (steam)	4%	49%	20	1.0	$/sqft	1.1	0.02	0.09
Repair malfunctioning steam traps	35%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	15%	20%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	2.6	0.05	0.06

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	2.9	0.09	0.04
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-64 Energy Efficiency Non-Equipment Data-Natural Gas School, 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	84,147.3	$/bldg	761,541.5	1.33	0.05
Insulation - Ducting	27%	50%	20	0.8	$/sqft	1.3	0.77	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	289,637.8	1.98	0.04
Insulation - Wall Cavity	7%	13%	20	19,567.9	$/bldg	318,121.5	2.09	0.04
HVAC - Duct Repair and Sealing	5%	25%	18	123.6	$/bldg	75,034.9	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.5	1.80	0.04
Windows - High Efficiency	73%	75%	20	11,849.0	$/bldg	526,064.9	8.98	0.02
Roof - High Reflectivity	50%	75%	15	3,299.9	$/bldg	119,276.3	7.37	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Air-Cooled Chiller - Economizer	4%	49%	10	813.6	$/sqft	20,889.9	1.10	0.03
Air-Cooled Chiller - VSD on fans	15%	66%	15	4,663.7	$/bldg	2,894.7	0.17	0.11
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
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	73%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	4.0	> 10	0.00
Water-Cooled Chiller - Economizer	4%	49%	10	81.4	$/sqft	20,889.9	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	9.0	1.82	0.06
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	403,118.9	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
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	73%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.0	0.04	0.09
RTU - Maintenance	73%	90%	18	9,281.0	$/bldg	260,342.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.8	0.09	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,758,300.0	> 10	0.00
Gas Boiler - Maintenance	35%	90%	3	2,039.9	$/bldg	1,181,200.0	6.74	0.00
Gas Furnace - Maintenance	35%	90%	3	5,289.5	$/bldg	749,700.0	1.95	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	8,650.1	$/bldg	1,048,699.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.2	1.84	0.04
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	1.3	5.58	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)
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	2.1	1.12	0.02
Water Heater - Faucet Aerators	31%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	31%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.2	0.15	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.7	2.64	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	17.8	> 10	0.00
Water Heater - Install Timer	15%	20%	15	0.3	$/sqft	2.0	0.68	0.06
Water Heater - Pipe Insulation	15%	20%	12	2,596.9	$/bldg	52,997.6	1.46	0.04
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.2	2.89	0.02
Water Heater - Pre-Rinse Spray Valve	31%	5%	5	100.0	$/sqft	14,822.0	7.54	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	6.0	0.63	0.06
Interior Lighting - Daylighting Controls	12%	13%	8	0.1	$/sqft	3.6	1.36	0.03
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	15%	56%	8	0.1	$/sqft	1.2	0.71	0.04
Interior Lighting - Task Lighting	4%	75%	5	0.2	$/sqft	1.2	0.11	0.12
Interior Lighting - Timeclocks and Timers	4%	56%	8	0.2	$/sqft	0.6	0.12	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.4	0.12	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	1.0	0.13	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.2	0.36	0.06
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	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	0.1	0.05	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	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	0.4	0.01	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	0.1	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	5,383.0	$/bldg	30,456.7	0.10	0.11
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	4%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	19%	75%	15	31,405.5	$/bldg	1,396,350.3	3.48	0.02
Thermostat - Clock/Programmable	50%	50%	11	928.1	$/bldg	248,159.9	> 10	0.00
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	0.7	1.05	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.2	1.46	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	5.4	2.59	0.01
Retrocommissioning - HVAC	9%	36%	25	0.8	$/sqft	3.2	0.73	0.06
Retrocommissioning - Lighting	31%	36%	5	0.1	$/sqft	5.4	1.30	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	8.7	5.26	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.32	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.56	0.03
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.43	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.1	0.69	0.09
Water Heating - Booster Water Heater	15%	20%	20	0.0	$/sqft	1.0	8.87	0.01
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.3	> 10	0.00
Boiler O2 Trim Controls	4%	49%	15	0.0	$/sqft	0.4	1.99	0.03
Boiler Parallel Positioning Control	4%	49%	15	0.2	$/sqft	0.4	0.14	0.10
Boiler blowdown heat exchanger (steam)	4%	49%	20	1.0	$/sqft	1.1	0.14	0.09
Repair malfunctioning steam traps	35%	90%	6	77.0	$/sqft	13,880.0	4.59	0.01
Insulate steam lines/condensate tank	15%	20%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	2.6	0.48	0.06

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	2.9	0.85	0.04
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-65 Energy Efficiency Non-Equipment Data-Electric School, 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	84,147.3	$/bldg	590,983.9	0.79	0.06
Insulation - Ducting	34%	50%	20	0.8	$/sqft	1.2	0.71	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	192,618.5	1.02	0.05
Insulation - Wall Cavity	7%	13%	20	19,567.9	$/bldg	155,732.6	0.76	0.05
HVAC - Duct Repair and Sealing	25%	25%	18	123.6	$/bldg	78,624.8	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.5	1.68	0.04
Windows - High Efficiency	67%	75%	20	11,849.0	$/bldg	136,952.4	4.21	0.05
Roof - High Reflectivity	34%	95%	15	3,299.9	$/bldg	94,055.8	6.12	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	15,579.1	0.84	0.04
Air-Cooled Chiller - VSD on fans	15%	66%	15	4,663.7	$/bldg	1,846.2	0.28	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188.9	1.97	0.05
Air-Cooled Chiller - Maintenance	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	3.4	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	15,579.1	8.23	0.01
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	7.2	1.46	0.07
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
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	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	0.8	0.03	0.09
RTU - Maintenance	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.6	0.01	0.13
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,285,100.0	1.45	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	1,015,500.0	0.56	0.00
Gas Furnace - Maintenance	34%	90%	3	5,289.5	$/bldg	816,000.0	0.17	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.3	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	8,650.1	$/bldg	1,022,510.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.6	2.92	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.0	8.84	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	9%	11%	15	0.2	$/sqft	7.1	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.0	0.52	0.02
Water Heater - Faucet Aerators	34%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	34%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.1	0.08	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.5	1.28	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	16.9	> 10	0.00
Water Heater - Install Timer	0%	0%	15	0.3	$/sqft	1.9	0.36	0.06
Water Heater - Pipe Insulation	0%	0%	12	2,596.9	$/bldg	59,686.7	1.27	0.03
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.1	1.36	0.02
Water Heater - Pre-Rinse Spray Valve	34%	5%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	4.6	0.05	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	3.6	1.32	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	1.2	0.69	0.04
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	1.2	0.11	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.6	0.12	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.4	0.12	0.12
Interior Fluorescent - Delamp and Install Reflectors	67%	72%	11	0.5	$/sqft	1.0	0.13	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.2	0.36	0.06
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.88	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	1.66	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.0	0.02	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.92	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	0.30	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	1.42	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	0.4	0.01	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	0.1	0.03	0.16
Cooking - Exhaust Hoods with Sensor Control	1%	11%	15	1,494.0	$/bldg	51,124.9	3.56	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	5,383.0	$/bldg	30,456.7	0.10	0.11
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	0%	75%	15	31,405.5	$/bldg	2,113,354.0	4.84	0.01
Thermostat - Clock/Programmable	72%	72%	11	928.1	$/bldg	245,367.8	> 10	0.00
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	7.10	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.7	0.95	0.10
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.9	1.32	0.05
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	5.4	2.53	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.9	0.66	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	5.4	1.26	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	7.8	4.74	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.59	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.48	0.03
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.29	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.0	2.62	0.07
Water Heating - Booster Water Heater	0%	0%	20	0.0	$/sqft	0.9	8.43	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.3	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.3	0.17	0.04
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.3	0.01	0.10
Boiler blowdown heat exchanger (steam)	37%	49%	20	1.0	$/sqft	0.9	0.01	0.09
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	0%	0%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	2.3	0.04	0.07

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	2.6	0.08	0.04
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-66 Energy Efficiency Non-Equipment Data-Natural Gas School, 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	84,147.3	$/bldg	590,983.9	1.07	0.06
Insulation - Ducting	34%	50%	20	0.8	$/sqft	1.2	0.71	0.08
Insulation - Radiant Barrier	2%	13%	20	21,500.9	$/bldg	192,618.5	1.37	0.05
Insulation - Wall Cavity	7%	13%	20	19,567.9	$/bldg	155,732.6	1.08	0.05
HVAC - Duct Repair and Sealing	25%	25%	18	123.6	$/bldg	78,624.8	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.5	1.68	0.04
Windows - High Efficiency	67%	75%	20	11,849.0	$/bldg	136,952.4	4.19	0.05
Roof - High Reflectivity	34%	95%	15	3,299.9	$/bldg	94,055.8	6.09	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	15,579.1	0.82	0.04
Air-Cooled Chiller - VSD on fans	15%	66%	15	4,663.7	$/bldg	1,846.2	0.27	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	-	0.00	-
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
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	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	3.4	> 10	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	15,579.1	8.23	0.01
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	7.2	1.46	0.07
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	371,117.4	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	-	0.00	-
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	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
RTU - Evaporative Precooler	0%	3%	20	3.0	$/sqft	0.8	0.03	0.09
RTU - Maintenance	67%	90%	18	9,281.0	$/bldg	253,447.9	> 10	0.03
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.6	0.08	0.13
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,285,100.0	> 10	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	1,015,500.0	6.97	0.00
Gas Furnace - Maintenance	34%	90%	3	5,289.5	$/bldg	816,000.0	2.13	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	6.3	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	8,650.1	$/bldg	1,022,510.1	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	3.6	2.94	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.0	8.88	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	9%	11%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	2.0	1.08	0.02
Water Heater - Faucet Aerators	34%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	34%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	1.1	0.14	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	4.5	2.54	0.01
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	16.9	> 10	0.00
Water Heater - Install Timer	0%	0%	15	0.3	$/sqft	1.9	0.66	0.06
Water Heater - Pipe Insulation	0%	0%	12	2,596.9	$/bldg	59,686.7	1.68	0.03
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.1	2.80	0.02
Water Heater - Pre-Rinse Spray Valve	34%	5%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	4.6	0.55	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	3.6	1.36	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	1.2	0.71	0.04
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	1.2	0.11	0.12
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.6	0.12	0.12
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.4	0.12	0.12
Interior Fluorescent - Delamp and Install Reflectors	67%	72%	11	0.5	$/sqft	1.0	0.13	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	6%	38%	8	0.0	$/sqft	0.2	0.36	0.06
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.3	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	0.02	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	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	0.4	0.01	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	0.1	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	5,383.0	$/bldg	30,456.7	0.10	0.11
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	0%	75%	15	31,405.5	$/bldg	2,113,354.0	6.84	0.01
Thermostat - Clock/Programmable	72%	72%	11	928.1	$/bldg	245,367.8	> 10	0.00
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	0.94	0.10
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.9	1.31	0.05
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	5.4	2.60	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.9	0.66	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	5.4	1.30	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	7.8	4.72	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.25	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	1.56	0.03
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.43	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	1.0	2.60	0.07
Water Heating - Booster Water Heater	0%	0%	20	0.0	$/sqft	0.9	8.43	0.02
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.3	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.3	1.91	0.04
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	0.3	0.13	0.10
Boiler blowdown heat exchanger (steam)	37%	49%	20	1.0	$/sqft	0.9	0.14	0.09
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	5.57	0.01
Insulate steam lines/condensate tank	0%	0%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.3	$/sqft	2.3	0.52	0.07

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	2.6	0.91	0.04
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-67 Energy Efficiency Non-Equipment Data-Electric Health, 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	2%	13%	20	92,807.8	$/bldg	267,655.3	0.25	0.08
Insulation - Ducting	10%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	102,362.2	0.48	0.07
Insulation - Wall Cavity	2%	13%	20	77,544.0	$/bldg	33,390.7	0.01	0.09
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	1.21	0.03
Windows - High Efficiency	66%	100%	20	95,051.0	$/bldg	576,356.8	0.76	0.06
Roof - High Reflectivity	39%	95%	15	3,639.5	$/bldg	119,276.3	5.20	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	2%	81%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	3%	75%	15	2,114.1	$/bldg	433.1	1.51	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	712,717.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	168,429.7	0.60	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	3.47	0.02
Air-Cooled Chiller - Maintenance	49%	90%	18	29,436.2	$/bldg	551,969.2	3.42	0.04
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	3.2	> 10	0.00
Water-Cooled Chiller - Economizer	2%	81%	10	81.4	$/sqft	99,822.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	30.2	2.03	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726.8	0.30	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	16,217.3	0.90	0.05
Water-Cooled Chiller - Maintenance	49%	90%	18	29,436.2	$/bldg	354,125.1	2.04	0.05
RTU - Evaporative Precooler	0%	2%	20	3.0	$/sqft	2.4	0.08	0.09
RTU - Maintenance	49%	90%	18	29,436.2	$/bldg	354,125.1	2.35	0.05
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	3.5	0.04	0.07
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,983,400.0	2.25	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	1,162,600.0	0.64	0.00
Gas Furnace - Maintenance	34%	90%	3	2,057.0	$/bldg	822,900.0	0.45	0.00
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	9.9	> 10	0.00
Heat Pump - Maintenance	5%	95%	18	3,921.2	$/bldg	857,590.6	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.1	4.28	0.02
Ventilation - Variable Speed Control	2%	81%	15	0.0	$/sqft	4.0	> 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%	8%	15	0.2	$/sqft	7.1	1.77	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	6.5	1.21	0.01
Water Heater - Faucet Aerators	20%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	20%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	3.6	0.19	0.07
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	14.4	3.11	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	53.9	> 10	0.00
Water Heater - Install Timer	15%	20%	15	0.3	$/sqft	6.1	0.90	0.03
Water Heater - Pipe Insulation	15%	20%	12	4,624.8	$/bldg	435,786.0	4.29	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	3.6	3.16	0.01
Water Heater - Pre-Rinse Spray Valve	20%	5%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	25.2	0.26	0.03
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	4.0	1.32	0.02
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	5%	56%	8	0.1	$/sqft	1.3	0.69	0.04
Interior Lighting - Task Lighting	10%	75%	5	0.2	$/sqft	1.4	0.10	0.11
Interior Lighting - Timeclocks and Timers	7%	56%	8	0.2	$/sqft	0.7	0.12	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.8	0.20	0.09
Interior Fluorescent - Delamp and Install Reflectors	12%	25%	11	0.5	$/sqft	1.1	0.13	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.18
Exterior Lighting - Daylighting Controls	11%	38%	8	0.0	$/sqft	0.2	0.15	0.08
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	1.52	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	0.1	0.05	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.04	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	38%	45%	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	1.40	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	0.4	0.01	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	0.1	0.03	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	8%	15	1,494.0	$/bldg	51,124.9	2.56	0.02
Office Equipment - ENERGY STAR Power Supplies	0%	0%	5	100.0	$/bldg	-	0.00	-
Office Equipment - Plug Load Occupancy Sensors	42%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	2%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	2%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,077,215.3	0.61	0.05
Thermostat - Clock/Programmable	63%	68%	11	2,943.6	$/bldg	9,105.8	0.19	0.10
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.47	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	1.4	0.55	0.06
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	6.4	2.21	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	6.0	2.40	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.4	1.10	0.05
Retrocommissioning - Lighting	12%	17%	5	0.1	$/sqft	6.0	1.20	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	17.0	2.39	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.83	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	3.91	0.01
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	3.03	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	2%	13%	20	1.4	$/sqft	2.1	0.31	0.08
Water Heating - Booster Water Heater	15%	20%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.4	> 10	0.00
Boiler O2 Trim Controls	2%	81%	15	0.0	$/sqft	1.7	2.85	0.00
Boiler Parallel Positioning Control	2%	81%	15	0.1	$/sqft	1.7	0.20	0.03
Boiler blowdown heat exchanger (steam)	2%	81%	20	0.3	$/sqft	4.7	0.21	0.04
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	15%	20%	12	1,302.0	$/bldg	1.7	0.00	0.13
Destratification Fans (HVLS)	2%	33%	12	0.1	$/sqft	10.1	0.62	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	11.2	1.08	0.00
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-68 Energy Efficiency Non-Equipment Data-Natural Gas Health, 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	2%	13%	20	92,807.8	$/bldg	267,655.3	0.65	0.08
Insulation - Ducting	10%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	102,362.2	1.09	0.07
Insulation - Wall Cavity	2%	13%	20	77,544.0	$/bldg	33,390.7	0.07	0.09
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	1.41	0.03
Windows - High Efficiency	66%	100%	20	95,051.0	$/bldg	576,356.8	1.16	0.06
Roof - High Reflectivity	39%	95%	15	3,639.5	$/bldg	119,276.3	6.68	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	2%	81%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - VSD on fans	3%	75%	15	2,114.1	$/bldg	433.1	1.63	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	712,717.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	168,429.7	0.65	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	44,150.2	3.75	0.02
Air-Cooled Chiller - Maintenance	49%	90%	18	29,436.2	$/bldg	551,969.2	3.72	0.04
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	3.2	> 10	0.00
Water-Cooled Chiller - Economizer	2%	81%	10	81.4	$/sqft	99,822.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	30.2	2.91	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	16,217.3	1.29	0.05
Water-Cooled Chiller - Maintenance	49%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
RTU - Evaporative Precooler	0%	2%	20	3.0	$/sqft	2.4	0.10	0.09
RTU - Maintenance	49%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	3.5	0.39	0.07
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,983,400.0	> 10	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	1,162,600.0	7.00	0.00
Gas Furnace - Maintenance	34%	90%	3	2,057.0	$/bldg	822,900.0	5.51	0.00
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	9.9	> 10	0.00
Heat Pump - Maintenance	5%	95%	18	3,921.2	$/bldg	857,590.6	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	7.1	6.01	0.02
Ventilation - Variable Speed Control	2%	81%	15	0.0	$/sqft	4.0	> 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%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	6.5	3.53	0.01
Water Heater - Faucet Aerators	20%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	20%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	3.6	0.45	0.07
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	14.4	8.29	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	53.9	> 10	0.00
Water Heater - Install Timer	15%	20%	15	0.3	$/sqft	6.1	2.12	0.03
Water Heater - Pipe Insulation	15%	20%	12	4,624.8	$/bldg	435,786.0	5.95	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	3.6	9.06	0.01
Water Heater - Pre-Rinse Spray Valve	20%	5%	5	100.0	$/sqft	14,822.0	7.53	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	25.2	2.72	0.03
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	4.0	1.65	0.02
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	5%	56%	8	0.1	$/sqft	1.3	0.87	0.04
Interior Lighting - Task Lighting	10%	75%	5	0.2	$/sqft	1.4	0.13	0.11
Interior Lighting - Timeclocks and Timers	7%	56%	8	0.2	$/sqft	0.7	0.15	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.8	0.25	0.09
Interior Fluorescent - Delamp and Install Reflectors	12%	25%	11	0.5	$/sqft	1.1	0.16	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.18
Exterior Lighting - Daylighting Controls	11%	38%	8	0.0	$/sqft	0.2	0.24	0.08
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	0.1	0.07	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	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	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	0.4	0.01	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	0.1	0.04	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	42%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	2%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	2%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,077,215.3	0.96	0.05
Thermostat - Clock/Programmable	63%	68%	11	2,943.6	$/bldg	9,105.8	0.23	0.10
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	1.4	0.66	0.06
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	6.4	2.88	0.04
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	6.0	2.90	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.4	1.44	0.05
Retrocommissioning - Lighting	12%	17%	5	0.1	$/sqft	6.0	1.45	0.01
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	17.0	3.13	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.89	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	5.11	0.01
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	3.29	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	2%	13%	20	1.4	$/sqft	2.1	0.41	0.08
Water Heating - Booster Water Heater	15%	20%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.4	> 10	0.00
Boiler O2 Trim Controls	2%	81%	15	0.0	$/sqft	1.7	> 10	0.00
Boiler Parallel Positioning Control	2%	81%	15	0.1	$/sqft	1.7	1.95	0.03
Boiler blowdown heat exchanger (steam)	2%	81%	20	0.3	$/sqft	4.7	2.03	0.04
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	4.85	0.01
Insulate steam lines/condensate tank	15%	20%	12	1,302.0	$/bldg	1.7	0.00	0.13
Destratification Fans (HVLS)	2%	33%	12	0.1	$/sqft	10.1	6.27	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	11.2	> 10	0.00
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-69 Energy Efficiency Non-Equipment Data-Electric Health, 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	2%	13%	20	92,807.8	$/bldg	154,895.2	0.15	0.08
Insulation - Ducting	9%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	51,141.2	0.20	0.08
Insulation - Wall Cavity	2%	13%	20	77,544.0	$/bldg	20,033.1	0.01	0.09
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	3.5	1.43	0.03
Windows - High Efficiency	91%	100%	20	95,051.0	$/bldg	167,597.7	0.40	0.08
Roof - High Reflectivity	45%	95%	15	3,639.5	$/bldg	94,055.8	5.52	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	61%	81%	10	813.6	$/sqft	1,025,553.0	> 10	0.00
Air-Cooled Chiller - VSD on fans	3%	75%	15	2,114.1	$/bldg	1,287.8	1.49	0.11
Air-Cooled Chiller - Chilled Water Reset	50%	75%	10	814.4	$/sqft	536,401.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.94	0.05
Air-Cooled Chiller - Maintenance	73%	90%	18	29,436.2	$/bldg	372,336.8	2.68	0.04
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	2.7	> 10	0.00
Water-Cooled Chiller - Economizer	61%	81%	10	81.4	$/sqft	-	0.00	-
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	24.0	2.31	0.03
Water-Cooled Chiller - Chilled Water Reset	50%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Water-Cooled Chiller - Maintenance	73%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
RTU - Evaporative Precooler	0%	1%	20	3.0	$/sqft	3.1	0.12	0.09
RTU - Maintenance	73%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.4	0.02	0.10
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,414,400.0	1.60	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	877,300.0	0.48	0.00
Gas Furnace - Maintenance	36%	90%	3	2,057.0	$/bldg	549,600.0	0.30	0.00
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	6.8	> 10	0.00
Heat Pump - Maintenance	9%	95%	18	3,921.2	$/bldg	597,122.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	10.2	8.61	0.01
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	5.8	> 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	6%	8%	15	0.2	$/sqft	7.1	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	6.1	1.15	0.01
Water Heater - Faucet Aerators	27%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	27%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	3.4	0.18	0.07
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	13.6	2.98	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	51.2	> 10	0.00
Water Heater - Install Timer	14%	14%	15	0.3	$/sqft	5.8	0.86	0.03
Water Heater - Pipe Insulation	14%	14%	12	4,624.8	$/bldg	434,858.0	4.36	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	3.4	3.03	0.01
Water Heater - Pre-Rinse Spray Valve	27%	5%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	10.4	0.11	0.05
Interior Lighting - Daylighting Controls	32%	32%	8	0.1	$/sqft	4.0	1.59	0.02
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	1.3	0.83	0.04
Interior Lighting - Task Lighting	27%	75%	5	0.2	$/sqft	1.4	0.12	0.11
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.7	0.15	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.8	0.25	0.09
Interior Fluorescent - Delamp and Install Reflectors	18%	25%	11	0.5	$/sqft	1.1	0.16	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.18
Exterior Lighting - Daylighting Controls	11%	38%	8	0.0	$/sqft	0.2	0.25	0.08
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	1.82	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	1.61	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.1	0.03	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.86	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	0.30	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	1.13	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	0.4	0.01	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	0.1	0.04	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	42%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
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	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,019,073.7	0.64	0.05
Thermostat - Clock/Programmable	87%	87%	11	2,943.6	$/bldg	31,614.0	0.80	0.06
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	1.5	0.69	0.06
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	6.7	3.02	0.03
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	6.0	2.81	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	6.7	1.51	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	6.0	1.40	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	17.8	3.28	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.24	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	4.69	0.01
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	3.11	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	2%	13%	20	0.3	$/sqft	2.2	1.81	0.06
Water Heating - Booster Water Heater	14%	14%	20	0.0	$/sqft	1.8	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.4	> 10	0.00
Boiler O2 Trim Controls	61%	81%	15	0.0	$/sqft	0.7	1.17	0.01
Boiler Parallel Positioning Control	61%	81%	15	0.1	$/sqft	0.7	0.08	0.06
Boiler blowdown heat exchanger (steam)	61%	81%	20	0.3	$/sqft	1.9	0.09	0.06
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	14%	14%	12	1,302.0	$/bldg	0.7	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.1	$/sqft	5.5	0.34	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	6.1	0.59	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-70 Energy Efficiency Non-Equipment Data-Natural Gas Health, 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	2%	13%	20	92,807.8	$/bldg	154,895.2	0.15	0.08
Insulation - Ducting	9%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	51,141.2	0.20	0.08
Insulation - Wall Cavity	2%	13%	20	77,544.0	$/bldg	20,033.1	0.01	0.09
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	3.5	1.43	0.03
Windows - High Efficiency	91%	100%	20	95,051.0	$/bldg	167,597.7	0.40	0.08
Roof - High Reflectivity	45%	95%	15	3,639.5	$/bldg	94,055.8	5.52	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	61%	81%	10	813.6	$/sqft	1,025,553.0	> 10	0.00
Air-Cooled Chiller - VSD on fans	3%	75%	15	2,114.1	$/bldg	1,287.8	1.49	0.11
Air-Cooled Chiller - Chilled Water Reset	50%	75%	10	814.4	$/sqft	536,401.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	18,188.9	1.94	0.05
Air-Cooled Chiller - Maintenance	73%	90%	18	29,436.2	$/bldg	372,336.8	2.68	0.04
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	2.7	> 10	0.00
Water-Cooled Chiller - Economizer	61%	81%	10	81.4	$/sqft	-	0.00	-
Water-Cooled Chiller - VSD on Fans	3%	75%	15	1.2	$/bldg	24.0	2.31	0.03
Water-Cooled Chiller - Chilled Water Reset	50%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	25%	37%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Water-Cooled Chiller - Maintenance	73%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
RTU - Evaporative Precooler	0%	1%	20	3.0	$/sqft	3.1	0.12	0.09
RTU - Maintenance	73%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Gas Boiler - High Efficiency Hot Water Circulation	1%	34%	10	0.4	$/sqft	1.4	0.02	0.10
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,414,400.0	1.60	0.00
Gas Boiler - Maintenance	34%	90%	3	2,039.9	$/bldg	877,300.0	0.48	0.00
Gas Furnace - Maintenance	36%	90%	3	2,057.0	$/bldg	549,600.0	0.30	0.00
Space Heating - Heat Recovery Ventilator	73%	81%	15	0.0	$/sqft	6.8	> 10	0.00
Heat Pump - Maintenance	9%	95%	18	3,921.2	$/bldg	597,122.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	10.2	8.61	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 - Variable Speed Control	0%	81%	15	0.0	$/sqft	5.8	> 10	0.00
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	6.1	1.15	0.01
Water Heater - Faucet Aerators	27%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	27%	5%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	3.4	0.18	0.07
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	13.6	2.98	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	51.2	> 10	0.00
Water Heater - Install Timer	14%	14%	15	0.3	$/sqft	5.8	0.86	0.03
Water Heater - Pipe Insulation	14%	14%	12	4,624.8	$/bldg	434,858.0	4.36	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	3.4	3.03	0.01
Water Heater - Pre-Rinse Spray Valve	27%	5%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	10.4	0.11	0.05
Interior Lighting - Daylighting Controls	32%	32%	8	0.1	$/sqft	4.0	1.59	0.02
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	1.3	0.83	0.04
Interior Lighting - Task Lighting	27%	75%	5	0.2	$/sqft	1.4	0.12	0.11
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.7	0.15	0.11
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	2.8	0.25	0.09
Interior Fluorescent - Delamp and Install Reflectors	18%	25%	11	0.5	$/sqft	1.1	0.16	0.11
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.18
Exterior Lighting - Daylighting Controls	11%	38%	8	0.0	$/sqft	0.2	0.25	0.08
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	1.82	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	1.61	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.1	0.03	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.05	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.3	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.86	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	0.30	0.06
Refrigerator - High Efficiency 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)
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	1.13	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	0.4	0.01	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	0.1	0.04	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	42%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
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	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,019,073.7	0.64	0.05
Thermostat - Clock/Programmable	87%	87%	11	2,943.6	$/bldg	31,614.0	0.80	0.06
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	1.5	0.69	0.06
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	6.7	3.02	0.03
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	6.0	2.81	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	6.7	1.51	0.05
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	6.0	1.40	0.01
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	17.8	3.28	0.05
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.24	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	4.69	0.01
Electronics - Smart Power Strip	42%	56%	7	0.0	$/sqft	0.0	3.11	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.4	> 10	0.00
Insulation - Foundation	2%	13%	20	0.3	$/sqft	2.2	1.81	0.06
Water Heating - Booster Water Heater	14%	14%	20	0.0	$/sqft	1.8	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.4	> 10	0.00
Boiler O2 Trim Controls	61%	81%	15	0.0	$/sqft	0.7	1.17	0.01
Boiler Parallel Positioning Control	61%	81%	15	0.1	$/sqft	0.7	0.08	0.06
Boiler blowdown heat exchanger (steam)	61%	81%	20	0.3	$/sqft	1.9	0.09	0.06
Repair malfunctioning steam traps	34%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	14%	14%	12	1,302.0	$/bldg	0.7	0.00	0.13

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Energy Savings (kBtu/ sq ft)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Destratification Fans (HVLS)	0%	33%	12	0.1	$/sqft	5.5	0.34	0.02
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	6.1	0.59	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-71 Energy Efficiency Non-Equipment Data-Electric Lodging, 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	92,807.8	$/bldg	267,655.3	0.29	0.08
Insulation - Ducting	5%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	102,362.2	0.54	0.07
Insulation - Wall Cavity	7%	13%	20	77,544.0	$/bldg	33,390.7	0.01	0.09
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	1.3	0.57	0.06
Windows - High Efficiency	62%	75%	20	95,051.0	$/bldg	576,356.8	0.92	0.06
Roof - High Reflectivity	33%	75%	15	3,639.5	$/bldg	119,276.3	5.95	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	99,822.4	5.27	0.01
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,114.1	$/bldg	3,532.9	1.03	0.10
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	712,717.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	168,429.7	0.65	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	16,217.3	1.29	0.05
Air-Cooled Chiller - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	0.9	7.91	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	81.4	$/sqft	99,822.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	6.6	0.56	0.07
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	30%	75%	15	27,671.0	$/bldg	168,429.7	0.48	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	16,217.3	0.94	0.05
Water-Cooled Chiller - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.14	0.05
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.2	0.04	0.09
RTU - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.78	0.05
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.9	0.01	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,983,400.0	2.25	0.00
Gas Boiler - Maintenance	14%	90%	3	2,039.9	$/bldg	1,162,600.0	0.64	0.00
Gas Furnace - Maintenance	14%	90%	3	2,057.0	$/bldg	822,900.0	0.45	0.00
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	3.4	> 10	0.00
Heat Pump - Maintenance	5%	95%	18	3,921.2	$/bldg	857,590.6	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.6	2.05	0.04
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	1.5	> 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	2.40	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	4.6	1.10	0.01
Water Heater - Faucet Aerators	33%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	33%	45%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.6	0.17	0.08
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	10.3	2.81	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	38.6	> 10	0.00
Water Heater - Install Timer	24%	29%	15	0.3	$/sqft	4.4	0.80	0.04
Water Heater - Pipe Insulation	24%	29%	12	4,624.8	$/bldg	435,786.0	4.24	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.6	2.89	0.01
Water Heater - Pre-Rinse Spray Valve	33%	5%	5	100.0	$/sqft	14,822.0	6.43	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	6.7	0.07	0.06
Interior Lighting - Daylighting Controls	10%	13%	8	0.1	$/sqft	2.0	0.55	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.7	0.29	0.07
Interior Lighting - Task Lighting	10%	75%	5	0.2	$/sqft	0.7	0.04	0.16
Interior Lighting - Timeclocks and Timers	5%	56%	8	0.2	$/sqft	0.3	0.05	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.3	0.02	0.17
Interior Fluorescent - Delamp and Install Reflectors	0%	56%	11	0.5	$/sqft	0.6	0.05	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	20%	38%	8	0.0	$/sqft	0.2	0.19	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	1.43	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	1.31	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.2	0.07	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.04	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.42	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	0.18	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.01	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.01	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	1.35	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	0.5	0.01	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	0.1	0.03	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.47	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	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	43%	48%	10	100.0	$/bldg	20,513.8	9.00	0.00
Pool Heater - Solar	0%	48%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	10%	90%	15	99,608.0	$/bldg	1,077,215.3	0.69	0.05
Thermostat - Clock/Programmable	52%	57%	11	2,943.6	$/bldg	144,873.0	3.79	0.02
Lodging - Guest Room Controls	14%	56%	15	260.0	$/sqft	3,134.1	6.27	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.5	0.27	0.11
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	2.4	0.96	0.06
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.0	1.06	0.01
Retrocommissioning - HVAC	9%	24%	25	0.8	$/sqft	2.4	0.48	0.07
Retrocommissioning - Lighting	43%	48%	5	0.1	$/sqft	3.0	0.53	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	6.4	1.28	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.78	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	3.85	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	0.45	0.04
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	0.8	0.17	0.09
Water Heating - Booster Water Heater	24%	29%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	0.4	0.76	0.01
Boiler Parallel Positioning Control	0%	49%	15	0.1	$/sqft	0.4	0.05	0.07
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.3	$/sqft	1.3	0.06	0.07
Repair malfunctioning steam traps	14%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	24%	29%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.1	$/sqft	2.9	0.18	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	3.2	0.31	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-72 Energy Efficiency Non-Equipment Data-Natural Gas Lodging, 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	92,807.8	$/bldg	267,655.3	0.64	0.08
Insulation - Ducting	5%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	102,362.2	1.08	0.07
Insulation - Wall Cavity	7%	13%	20	77,544.0	$/bldg	33,390.7	0.06	0.09
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	1.3	0.60	0.06
Windows - High Efficiency	62%	75%	20	95,051.0	$/bldg	576,356.8	1.15	0.06
Roof - High Reflectivity	33%	75%	15	3,639.5	$/bldg	119,276.3	6.68	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	99,822.4	5.27	0.01
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,114.1	$/bldg	3,532.9	1.03	0.10
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	712,717.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	168,429.7	0.65	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	16,217.3	1.29	0.05
Air-Cooled Chiller - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	0.9	9.57	0.00
Water-Cooled Chiller - Economizer	0%	49%	10	81.4	$/sqft	99,822.4	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	6.6	0.77	0.07
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	30%	75%	15	27,671.0	$/bldg	168,429.7	0.65	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	16,217.3	1.29	0.05
Water-Cooled Chiller - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.2	0.05	0.09
RTU - Maintenance	14%	90%	18	29,436.2	$/bldg	354,125.1	2.98	0.05
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.9	0.11	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,983,400.0	> 10	0.00
Gas Boiler - Maintenance	14%	90%	3	2,039.9	$/bldg	1,162,600.0	7.33	0.00
Gas Furnace - Maintenance	14%	90%	3	2,057.0	$/bldg	822,900.0	5.50	0.00
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	3.4	> 10	0.00
Heat Pump - Maintenance	5%	95%	18	3,921.2	$/bldg	857,590.6	> 10	0.00
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.6	2.12	0.04
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	1.5	> 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	4.6	2.45	0.01
Water Heater - Faucet Aerators	33%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	33%	45%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.6	0.32	0.08
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	10.3	5.81	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	38.6	> 10	0.00
Water Heater - Install Timer	24%	29%	15	0.3	$/sqft	4.4	1.51	0.04
Water Heater - Pipe Insulation	24%	29%	12	4,624.8	$/bldg	435,786.0	5.95	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.6	6.30	0.01
Water Heater - Pre-Rinse Spray Valve	33%	5%	5	100.0	$/sqft	14,822.0	7.53	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	6.7	0.74	0.06
Interior Lighting - Daylighting Controls	10%	13%	8	0.1	$/sqft	2.0	0.76	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.7	0.40	0.07
Interior Lighting - Task Lighting	10%	75%	5	0.2	$/sqft	0.7	0.06	0.16
Interior Lighting - Timeclocks and Timers	5%	56%	8	0.2	$/sqft	0.3	0.07	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.3	0.02	0.17
Interior Fluorescent - Delamp and Install Reflectors	0%	56%	11	0.5	$/sqft	0.6	0.07	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	20%	38%	8	0.0	$/sqft	0.2	0.28	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	0.2	0.10	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	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	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	0.5	0.01	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	0.1	0.04	0.15
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	13%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	43%	48%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	48%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	10%	90%	15	99,608.0	$/bldg	1,077,215.3	0.95	0.05
Thermostat - Clock/Programmable	52%	57%	11	2,943.6	$/bldg	144,873.0	4.22	0.02
Lodging - Guest Room Controls	14%	56%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.5	0.30	0.11
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	2.4	1.09	0.06
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.0	1.43	0.01
Retrocommissioning - HVAC	9%	24%	25	0.8	$/sqft	2.4	0.54	0.07
Retrocommissioning - Lighting	43%	48%	5	0.1	$/sqft	3.0	0.71	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	6.4	1.45	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.77	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.2	5.34	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	0.50	0.04
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	0.8	0.19	0.09
Water Heating - Booster Water Heater	24%	29%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	0.4	7.94	0.01
Boiler Parallel Positioning Control	0%	49%	15	0.1	$/sqft	0.4	0.55	0.07
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.3	$/sqft	1.3	0.57	0.07
Repair malfunctioning steam traps	14%	90%	6	77.0	$/sqft	13,880.0	5.09	0.01
Insulate steam lines/condensate tank	24%	29%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.1	$/sqft	2.9	1.91	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	3.2	3.35	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-73 Energy Efficiency Non-Equipment Data-Electric Lodging, 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	92,807.8	$/bldg	154,895.2	0.15	0.08
Insulation - Ducting	0%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	51,141.2	0.21	0.08
Insulation - Wall Cavity	7%	13%	20	77,544.0	$/bldg	20,033.1	0.01	0.09
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	1.6	0.67	0.06
Windows - High Efficiency	75%	75%	20	95,051.0	$/bldg	167,597.7	0.40	0.08
Roof - High Reflectivity	50%	95%	15	3,639.5	$/bldg	94,055.8	5.57	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	99,822.4	5.27	0.01
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,114.1	$/bldg	3,612.7	0.85	0.10
Air-Cooled Chiller - Chilled Water Reset	10%	75%	10	814.4	$/sqft	536,401.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Air-Cooled Chiller - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	0.8	8.91	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	-	0.00	-
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	5.2	0.60	0.08
Water-Cooled Chiller - Chilled Water Reset	10%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Water-Cooled Chiller - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.7	0.01	0.12
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,414,400.0	1.60	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	877,300.0	0.48	0.00
Gas Furnace - Maintenance	25%	90%	3	2,057.0	$/bldg	549,600.0	0.30	0.00
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	3.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,921.2	$/bldg	597,122.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	4.2	3.41	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.4	> 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	2.46	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	4.4	1.08	0.01
Water Heater - Faucet Aerators	33%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	33%	45%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.5	0.16	0.08
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	9.8	2.75	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	36.9	> 10	0.00
Water Heater - Install Timer	30%	30%	15	0.3	$/sqft	4.2	0.79	0.04
Water Heater - Pipe Insulation	30%	30%	12	4,624.8	$/bldg	434,858.0	4.36	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.5	2.83	0.01
Water Heater - Pre-Rinse Spray Valve	33%	5%	5	100.0	$/sqft	14,822.0	6.55	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	5.0	0.05	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	2.0	0.72	0.04
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	0.7	0.38	0.07
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	0.7	0.06	0.16
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.3	0.07	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.3	0.02	0.17
Interior Fluorescent - Delamp and Install Reflectors	0%	56%	11	0.5	$/sqft	0.6	0.07	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	20%	38%	8	0.0	$/sqft	0.2	0.26	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	1.70	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	1.51	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.1	0.04	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.73	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	0.30	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	1.12	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	0.5	0.01	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	0.1	0.04	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.56	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	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	55%	55%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	55%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,019,073.7	0.64	0.05
Thermostat - Clock/Programmable	100%	100%	11	2,943.6	$/bldg	165,158.8	4.85	0.02
Lodging - Guest Room Controls	56%	56%	15	260.0	$/sqft	3,134.1	7.12	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.5	0.28	0.11
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.2	1.02	0.06
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	3.0	1.38	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.2	0.51	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.0	0.69	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	6.0	1.37	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.04	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.3	4.80	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	0.47	0.04
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.7	0.75	0.08
Water Heating - Booster Water Heater	30%	30%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.3	0.56	0.01
Boiler Parallel Positioning Control	37%	49%	15	0.1	$/sqft	0.3	0.04	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.3	$/sqft	0.9	0.04	0.07
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	30%	30%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.1	$/sqft	2.1	0.13	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	2.3	0.22	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-74 Energy Efficiency Non-Equipment Data-Natural Gas Lodging, 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	92,807.8	$/bldg	154,895.2	0.34	0.08
Insulation - Ducting	0%	50%	20	0.8	$/sqft	-	0.00	-
Insulation - Radiant Barrier	5%	13%	20	23,713.7	$/bldg	51,141.2	0.45	0.08
Insulation - Wall Cavity	7%	13%	20	77,544.0	$/bldg	20,033.1	0.04	0.09
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	1.6	0.67	0.06
Windows - High Efficiency	75%	75%	20	95,051.0	$/bldg	167,597.7	0.40	0.08
Roof - High Reflectivity	50%	95%	15	3,639.5	$/bldg	94,055.8	5.53	0.03
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	99,822.4	5.27	0.01
Air-Cooled Chiller - VSD on fans	15%	66%	15	2,114.1	$/bldg	3,612.7	0.85	0.10
Air-Cooled Chiller - Chilled Water Reset	10%	75%	10	814.4	$/sqft	536,401.6	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Air-Cooled Chiller - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	0.8	8.91	0.00
Water-Cooled Chiller - Economizer	37%	49%	10	81.4	$/sqft	-	0.00	-
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	5.2	0.60	0.08
Water-Cooled Chiller - Chilled Water Reset	10%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	155,585.7	0.45	0.07
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	12,866.7	1.10	0.06
Water-Cooled Chiller - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
RTU - Evaporative Precooler	0%	8%	20	3.0	$/sqft	1.1	0.04	0.09
RTU - Maintenance	25%	90%	18	29,436.2	$/bldg	350,466.8	2.85	0.05
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.7	0.09	0.12
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	1,414,400.0	> 10	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	877,300.0	6.04	0.00
Gas Furnace - Maintenance	25%	90%	3	2,057.0	$/bldg	549,600.0	3.70	0.00
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	3.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,921.2	$/bldg	597,122.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	4.2	3.43	0.03
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	2.4	> 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	4.4	2.39	0.01
Water Heater - Faucet Aerators	33%	20%	9	8.0	$/sqft	1,482.2	> 10	0.01
Water Heater - Low Flow Showerheads	33%	45%	10	12.0	$/sqft	13,382.4	> 10	0.00
Water Heater - High Efficiency Circulation Pump	0%	0%	10	0.4	$/sqft	2.5	0.32	0.08
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	9.8	5.67	0.00
Water Heater - Solar System	0%	25%	20	0.0	$/sqft	36.9	> 10	0.00
Water Heater - Install Timer	30%	30%	15	0.3	$/sqft	4.2	1.49	0.04
Water Heater - Pipe Insulation	30%	30%	12	4,624.8	$/bldg	434,858.0	6.05	0.01
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	2.5	6.18	0.01
Water Heater - Pre-Rinse Spray Valve	33%	5%	5	100.0	$/sqft	14,822.0	7.58	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	5.0	0.59	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	2.0	0.76	0.04
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	0.7	0.40	0.07
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	0.7	0.06	0.16
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.3	0.07	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.3	0.02	0.17
Interior Fluorescent - Delamp and Install Reflectors	0%	56%	11	0.5	$/sqft	0.6	0.07	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.1	0.01	0.17
Exterior Lighting - Daylighting Controls	20%	38%	8	0.0	$/sqft	0.2	0.28	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	0.1	0.05	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	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	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	0.5	0.01	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	0.1	0.04	0.15
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	13%	56%	5	17,073.0	$/bldg	19,756.8	0.02	0.22
Pool Pump - Timer	55%	55%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	55%	15	3,500.0	$/bldg	0.1	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	0%	90%	15	99,608.0	$/bldg	1,019,073.7	0.84	0.05
Thermostat - Clock/Programmable	100%	100%	11	2,943.6	$/bldg	165,158.8	4.81	0.02
Lodging - Guest Room Controls	56%	56%	15	260.0	$/sqft	3,134.1	7.06	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.5	0.28	0.11
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.2	1.01	0.06
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	3.0	1.43	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.2	0.51	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.0	0.72	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	6.0	1.35	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.76	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	0.3	5.61	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	0.50	0.04
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.7	0.75	0.08
Water Heating - Booster Water Heater	30%	30%	20	0.0	$/sqft	1.9	> 10	0.00
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	0.3	6.50	0.01
Boiler Parallel Positioning Control	37%	49%	15	0.1	$/sqft	0.3	0.45	0.08
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.3	$/sqft	0.9	0.47	0.07
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	5.60	0.01
Insulate steam lines/condensate tank	30%	30%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	0%	0%	12	0.1	$/sqft	2.1	1.53	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	2.3	2.67	0.02
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-75 Energy Efficiency Non-Equipment Data-Electric Warehouse, 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	0.46	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.15	0.09
Insulation - Radiant Barrier	7%	13%	20	14,360.4	$/bldg	92,766.4	0.77	0.06
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	217,391.3	0.56	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.4	1.79	0.04
Windows - High Efficiency	47%	75%	20	2,181.0	$/bldg	-	0.00	-
Roof - High Reflectivity	50%	75%	15	2,204.0	$/bldg	183,780.8	8.12	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	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	15%	66%	15	2,063.3	$/bldg	843.3	0.95	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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	62%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 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	15%	66%	15	1.2	$/bldg	12.6	6.30	0.05
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	62%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
RTU - Evaporative Precooler	0%	6%	20	3.0	$/sqft	1.1	0.03	0.09
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969.2	6.73	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.08	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300.0	1.63	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700.0	0.19	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100.0	0.02	0.07
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	12.2	> 10	0.00
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	1.0	0.75	0.06
Ventilation - Variable Speed Control	4%	81%	15	0.0	$/sqft	0.5	3.05	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)
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.36	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	0.5	0.12	0.06
Water Heater - Faucet Aerators	0%	0%	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	0.3	0.02	0.14
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	1.1	0.32	0.03
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	4.2	6.64	0.01
Water Heater - Install Timer	6%	11%	15	0.3	$/sqft	0.5	0.09	0.10
Water Heater - Pipe Insulation	6%	11%	12	3,001.4	$/bldg	35,750.0	0.67	0.05
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.3	0.31	0.05
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	54.0	0.56	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.71	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	0.7	0.37	0.07
Interior Lighting - Task Lighting	6%	75%	5	0.2	$/sqft	0.7	0.04	0.16
Interior Lighting - Timeclocks and Timers	3%	56%	8	0.2	$/sqft	0.3	0.06	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.13	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.07	0.12
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	0.16	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	1.45	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	1.34	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	-	0.00	-
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.13	0.10
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	1.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.43	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	0.30	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	1.37	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	-	0.00	-
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	-	0.00	-
Cooking - Exhaust Hoods with Sensor Control	1%	8%	15	1,494.0	$/bldg	51,124.9	3.41	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	7,190.6	$/bldg	20,441.7	0.05	0.16
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%	75%	15	41,951.5	$/bldg	899,536.2	1.42	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	9,105.8	1.31	0.07
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.21	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.8	1.09	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.3	1.10	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.1	1.07	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	3.3	0.55	0.06
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.1	0.54	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	8.9	5.21	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.27	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	1.0	6.47	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	1.10	0.02
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.1	0.68	0.09
Water Heating - Booster Water Heater	6%	11%	20	0.0	$/sqft	0.2	2.92	0.04
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	7.5	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	3.6	2.58	0.00
Boiler Parallel Positioning Control	0%	49%	15	0.2	$/sqft	3.6	0.18	0.03
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.7	$/sqft	10.1	0.19	0.04
Repair malfunctioning steam traps	32%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	6%	11%	12	1,302.0	$/bldg	3.6	0.00	0.13
Destratification Fans (HVLS)	4%	33%	12	0.2	$/sqft	14.7	0.38	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	16.3	0.66	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-76 Energy Efficiency Non-Equipment Data-Natural Gas Warehouse, 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	15%	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	54.7	$/bldg	105,158.2	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	2.4	2.23	0.04
Windows - High Efficiency	47%	75%	20	2,181.0	$/bldg	-	0.00	-
Roof - High Reflectivity	50%	75%	15	2,204.0	$/bldg	183,780.8	> 10	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	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	15%	66%	15	2,063.3	$/bldg	843.3	0.95	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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	62%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 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	15%	66%	15	1.2	$/bldg	12.6	6.30	0.05
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	62%	90%	18	12,397.5	$/bldg	551,969.2	8.82	0.02
RTU - Evaporative Precooler	0%	6%	20	3.0	$/sqft	1.1	0.05	0.09
RTU - Maintenance	62%	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	7.4	0.84	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300.0	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700.0	2.09	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100.0	0.19	0.07
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	12.2	> 10	0.00
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,750.4	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	1.0	0.79	0.06
Ventilation - Variable Speed Control	4%	81%	15	0.0	$/sqft	0.5	3.21	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)
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	0.5	0.27	0.06
Water Heater - Faucet Aerators	0%	0%	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	0.3	0.04	0.14
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	1.1	0.65	0.03
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	4.2	> 10	0.01
Water Heater - Install Timer	6%	11%	15	0.3	$/sqft	0.5	0.17	0.10
Water Heater - Pipe Insulation	6%	11%	12	3,001.4	$/bldg	35,750.0	0.88	0.05
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.3	0.68	0.05
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	54.0	5.83	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.02	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	0.7	0.54	0.07
Interior Lighting - Task Lighting	6%	75%	5	0.2	$/sqft	0.7	0.08	0.16
Interior Lighting - Timeclocks and Timers	3%	56%	8	0.2	$/sqft	0.3	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
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	0.28	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	-	0.00	-
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.14	0.10
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	1.8	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	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	-	0.00	-
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	-	0.00	-
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	7,190.6	$/bldg	20,441.7	0.05	0.16
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%	75%	15	41,951.5	$/bldg	899,536.2	1.90	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	9,105.8	1.75	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	0.8	1.42	0.09
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	3.3	1.50	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.1	1.49	0.01
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	3.3	0.75	0.06
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.1	0.74	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	8.9	7.16	0.06
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.61	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	1.0	8.87	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	1.22	0.02
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	1.1	0.93	0.09
Water Heating - Booster Water Heater	6%	11%	20	0.0	$/sqft	0.2	2.95	0.04
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	7.5	> 10	0.00
Boiler O2 Trim Controls	0%	49%	15	0.0	$/sqft	3.6	> 10	0.00
Boiler Parallel Positioning Control	0%	49%	15	0.2	$/sqft	3.6	1.77	0.03
Boiler blowdown heat exchanger (steam)	0%	49%	20	0.7	$/sqft	10.1	1.83	0.04
Repair malfunctioning steam traps	32%	90%	6	77.0	$/sqft	13,880.0	4.86	0.01
Insulate steam lines/condensate tank	6%	11%	12	1,302.0	$/bldg	3.6	0.00	0.13
Destratification Fans (HVLS)	4%	33%	12	0.2	$/sqft	14.7	3.84	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	16.3	6.74	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-77 Energy Efficiency Non-Equipment Data-Electric Warehouse, 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	7%	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	54.7	$/bldg	46,691.7	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	4.0	2.36	0.03
Windows - High Efficiency	78%	100%	20	2,181.0	$/bldg	-	0.00	-
Roof - High Reflectivity	56%	95%	15	2,204.0	$/bldg	73,416.6	5.77	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	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	15%	66%	15	2,063.3	$/bldg	1,253.6	0.78	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	63%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 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	15%	66%	15	1.2	$/bldg	11.0	5.52	0.06
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	63%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	7%	20	3.0	$/sqft	0.9	0.03	0.09
RTU - Maintenance	63%	90%	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	5.5	0.06	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400.0	1.11	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900.0	0.13	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400.0	0.03	0.04
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	16.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	0.9	0.78	0.07
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	0.5	3.15	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)
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	0.5	0.11	0.07
Water Heater - Faucet Aerators	0%	0%	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	0.3	0.02	0.14
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	1.1	0.30	0.03
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	3.9	6.36	0.01
Water Heater - Install Timer	0%	0%	15	0.3	$/sqft	0.4	0.09	0.10
Water Heater - Pipe Insulation	0%	0%	12	3,001.4	$/bldg	32,559.2	0.59	0.05
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.3	0.29	0.05
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	40.4	0.42	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.00	0.04
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	0.7	0.52	0.07
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	0.7	0.07	0.16
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.3	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
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	0.28	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	1.75	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	1.55	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	-	0.00	-
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.13	0.10
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	1.8	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.77	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	0.30	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	1.42	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	-	0.00	-
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	-	0.00	-
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	7,190.6	$/bldg	20,441.7	0.05	0.16
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%	75%	15	41,951.5	$/bldg	531,443.5	0.99	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	31,614.0	6.03	0.03
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	6.99	0.05
HVAC - Occupancy Sensors	56%	56%	8	0.1	$/sqft	0.6	1.13	0.10
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	2.7	1.19	0.05
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.1	1.45	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.7	0.60	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.1	0.73	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	7.1	5.70	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.75	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	1.0	7.67	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	1.15	0.02
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.9	3.15	0.08
Water Heating - Booster Water Heater	0%	0%	20	0.0	$/sqft	0.2	2.80	0.04
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	7.5	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	2.7	1.93	0.00
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	2.7	0.13	0.04
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	7.5	0.14	0.05
Repair malfunctioning steam traps	44%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	0%	0%	12	1,302.0	$/bldg	2.7	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.2	$/sqft	12.4	0.32	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	13.8	0.56	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-78 Energy Efficiency Non-Equipment Data-Natural Gas Warehouse, 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	7%	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	54.7	$/bldg	46,691.7	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	4.0	2.37	0.03
Windows - High Efficiency	78%	100%	20	2,181.0	$/bldg	-	0.00	-
Roof - High Reflectivity	56%	95%	15	2,204.0	$/bldg	73,416.6	5.82	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	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	15%	66%	15	2,063.3	$/bldg	1,253.6	0.78	0.11
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	63%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 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	15%	66%	15	1.2	$/bldg	11.0	5.52	0.06
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	63%	90%	18	12,397.5	$/bldg	372,336.8	6.36	0.03
RTU - Evaporative Precooler	0%	7%	20	3.0	$/sqft	0.9	0.03	0.09
RTU - Maintenance	63%	90%	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	5.5	0.73	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400.0	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900.0	1.57	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400.0	0.33	0.04
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.0	$/sqft	16.7	> 10	0.00
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,656.6	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	0.9	0.78	0.07
Ventilation - Variable Speed Control	0%	81%	15	0.0	$/sqft	0.5	3.15	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)
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.47	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	0.5	0.26	0.07
Water Heater - Faucet Aerators	0%	0%	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	0.3	0.04	0.14
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	1.1	0.63	0.03
Water Heater - Solar System	0%	25%	20	0.1	$/sqft	3.9	> 10	0.01
Water Heater - Install Timer	0%	0%	15	0.3	$/sqft	0.4	0.17	0.10
Water Heater - Pipe Insulation	0%	0%	12	3,001.4	$/bldg	32,559.2	0.78	0.05
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.3	0.66	0.05
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	40.4	4.81	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.02	0.04
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	0.7	0.54	0.07
Interior Lighting - Task Lighting	0%	75%	5	0.2	$/sqft	0.7	0.08	0.16
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.3	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
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	0.28	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	-	0.00	-
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.4	0.14	0.10
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	1.8	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	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	-	0.00	-
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	-	0.00	-
Cooking - Exhaust Hoods with Sensor Control	1%	8%	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	7,190.6	$/bldg	20,441.7	0.05	0.16
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%	75%	15	41,951.5	$/bldg	531,443.5	1.02	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	31,614.0	6.08	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	0.6	1.14	0.10
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	2.7	1.21	0.05
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.1	1.49	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.7	0.60	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.1	0.74	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	7.1	5.76	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.42	0.06
Refrigerator - eCube	5%	75%	12	0.0	$/sqft	1.0	8.72	0.01
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	1.22	0.02
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.1	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.9	3.18	0.08
Water Heating - Booster Water Heater	0%	0%	20	0.0	$/sqft	0.2	2.80	0.04
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	7.5	> 10	0.00
Boiler O2 Trim Controls	37%	49%	15	0.0	$/sqft	2.7	> 10	0.00
Boiler Parallel Positioning Control	37%	49%	15	0.2	$/sqft	2.7	1.53	0.04
Boiler blowdown heat exchanger (steam)	37%	49%	20	0.7	$/sqft	7.5	1.59	0.05
Repair malfunctioning steam traps	44%	90%	6	77.0	$/sqft	13,880.0	5.59	0.01
Insulate steam lines/condensate tank	0%	0%	12	1,302.0	$/bldg	2.7	0.00	0.13
Destratification Fans (HVLS)	0%	33%	12	0.2	$/sqft	12.4	3.77	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)
Exhaust Hood Makeup Air	1%	8%	10	0.1	$/sqft	13.8	6.60	0.01
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-79 Energy Efficiency Non-Equipment Data-Electric Miscellaneous, 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	11,311.1	$/bldg	108,288.9	1.10	0.05
Insulation - Ducting	18%	50%	20	0.8	$/sqft	1.0	0.30	0.09
Insulation - Radiant Barrier	7%	13%	20	2,890.2	$/bldg	42,706.0	1.68	0.04
Insulation - Wall Cavity	7%	13%	20	4,892.2	$/bldg	56,205.6	1.05	0.05
HVAC - Duct Repair and Sealing	5%	25%	18	9.0	$/bldg	4,102.8	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	1.6	0.84	0.06
Windows - High Efficiency	63%	75%	20	2,181.0	$/bldg	97,788.4	5.69	0.02
Roof - High Reflectivity	36%	75%	15	443.6	$/bldg	26,405.8	9.08	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	2%	49%	10	813.6	$/sqft	27,044.0	1.43	0.03
Air-Cooled Chiller - VSD on fans	15%	66%	15	339.0	$/bldg	433.1	> 10	0.10
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	45%	90%	18	1,247.6	$/bldg	57,210.7	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	1.9	1.08	0.02
Water-Cooled Chiller - Economizer	2%	49%	10	81.4	$/sqft	27,044.0	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	9.5	1.28	0.06
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.34	0.08
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	2.91	0.02
Water-Cooled Chiller - Maintenance	45%	90%	18	1,247.6	$/bldg	57,210.7	8.49	0.02
RTU - Evaporative Precooler	0%	10%	20	3.0	$/sqft	1.0	0.03	0.09
RTU - Maintenance	45%	90%	18	1,247.6	$/bldg	57,210.7	8.72	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.9	0.01	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300.0	1.63	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	346,700.0	0.19	0.01
Gas Furnace - Maintenance	25%	90%	3	337.5	$/bldg	26,400.0	0.09	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.1	$/sqft	4.2	1.76	0.03
Heat Pump - Maintenance	6%	95%	18	628.7	$/bldg	88,653.8	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	1.9	1.42	0.05
Ventilation - Variable Speed Control	1%	81%	15	0.2	$/sqft	1.1	0.58	0.07

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	2.21	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.7	0.50	0.02
Water Heater - Faucet Aerators	27%	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	1.0	0.09	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.9	1.47	0.01
Water Heater - Solar System	0%	25%	20	0.5	$/sqft	14.5	3.27	0.03
Water Heater - Install Timer	24%	29%	15	0.3	$/sqft	1.6	0.46	0.07
Water Heater - Pipe Insulation	24%	29%	12	952.1	$/bldg	4,924.1	0.36	0.08
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.0	1.30	0.02
Water Heater - Pre-Rinse Spray Valve	0%	0%	5	100.0	$/sqft	14,822.0	6.49	0.01
Combined Boiler & Water Htg. Unit	0%	50%	15	0.8	$/sqft	6.3	0.07	0.06
Interior Lighting - Daylighting Controls	8%	13%	8	0.1	$/sqft	2.3	0.79	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	7%	56%	8	0.1	$/sqft	0.8	0.42	0.06
Interior Lighting - Task Lighting	18%	75%	5	0.2	$/sqft	0.8	0.04	0.15
Interior Lighting - Timeclocks and Timers	5%	56%	8	0.2	$/sqft	0.4	0.07	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.6	0.04	0.15
Interior Fluorescent - Delamp and Install Reflectors	15%	68%	11	0.5	$/sqft	0.7	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.03	0.15
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.7	0.74	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.8	0.00	0.10
Refrigerator - Anti-Sweat Door Heater	0%	0%	12	250.0	$/sqft	8,953.8	1.31	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	1.21	0.02
Refrigerator - Demand Defrost	0%	75%	16	0.2	$/sqft	0.2	0.05	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.04	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.30	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	0.18	0.06
Refrigerator - High Efficiency Compressor	10%	38%	15	0.3	$/sqft	0.1	0.01	0.11
Refrigerator - Variable Speed Compressor	10%	38%	15	0.3	$/sqft	0.1	0.01	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	0.5	0.01	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	0.1	0.03	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.20	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	723.6	$/bldg	4,922.0	0.11	0.10
Pool Pump - Timer	1%	34%	10	100.0	$/bldg	20,513.8	9.00	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	1%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	10%	75%	15	4,221.5	$/bldg	899,536.2	> 10	0.00
Thermostat - Clock/Programmable	45%	50%	11	124.8	$/bldg	28,160.9	> 10	0.00
Lodging - Guest Room Controls	0%	0%	15	260.0	$/sqft	3,134.1	5.60	0.05
HVAC - Occupancy Sensors	14%	56%	8	0.1	$/sqft	0.6	0.46	0.10
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	2.7	0.97	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.5	1.36	0.01
Retrocommissioning - HVAC	9%	24%	25	0.8	$/sqft	2.7	0.48	0.07
Retrocommissioning - Lighting	34%	39%	5	0.1	$/sqft	3.5	0.68	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	7.3	2.12	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.90	0.06
Refrigerator - eCube	5%	75%	12	0.1	$/sqft	0.2	0.15	0.09
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.62	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	0.9	0.28	0.09
Water Heating - Booster Water Heater	24%	29%	20	0.1	$/sqft	0.9	1.50	0.06
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	2%	49%	15	0.1	$/sqft	0.4	0.03	0.08
Boiler Parallel Positioning Control	2%	49%	15	1.7	$/sqft	0.4	0.00	0.11
Boiler blowdown heat exchanger (steam)	2%	49%	20	7.2	$/sqft	1.2	0.00	0.10
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	24%	29%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	1%	33%	12	2.4	$/sqft	2.6	0.01	0.12

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	1.2	$/sqft	2.9	0.01	0.11
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-80 Energy Efficiency Non-Equipment Data-Natural Gas Miscellaneous, 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	11,311.1	$/bldg	108,288.9	1.56	0.05
Insulation - Ducting	18%	50%	20	0.8	$/sqft	1.0	0.38	0.09
Insulation - Radiant Barrier	7%	13%	20	2,890.2	$/bldg	42,706.0	2.40	0.04
Insulation - Wall Cavity	7%	13%	20	4,892.2	$/bldg	56,205.6	1.53	0.05
HVAC - Duct Repair and Sealing	5%	25%	18	9.0	$/bldg	4,102.8	> 10	0.00
Doors - High Efficiency	0%	0%	10	0.2	$/sqft	1.6	0.97	0.06
Windows - High Efficiency	63%	75%	20	2,181.0	$/bldg	97,788.4	7.62	0.02
Roof - High Reflectivity	36%	75%	15	443.6	$/bldg	26,405.8	> 10	0.01
Air-Cooled Chiller - Condenser Air Temperature Reset	30%	75%	10	814.4	$/sqft	723,510.2	> 10	0.00
Air-Cooled Chiller - Economizer	2%	49%	10	813.6	$/sqft	27,044.0	1.43	0.03
Air-Cooled Chiller - VSD on fans	15%	66%	15	339.0	$/bldg	433.1	> 10	0.10
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	45%	90%	18	1,247.6	$/bldg	57,210.7	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	1.9	1.27	0.02
Water-Cooled Chiller - Economizer	2%	49%	10	81.4	$/sqft	27,044.0	> 10	0.00
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	9.5	1.65	0.06
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.44	0.08
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	45%	90%	18	1,247.6	$/bldg	57,210.7	> 10	0.02
RTU - Evaporative Precooler	0%	10%	20	3.0	$/sqft	1.0	0.04	0.09
RTU - Maintenance	45%	90%	18	1,247.6	$/bldg	57,210.7	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	0.9	0.10	0.12
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300.0	> 10	0.00
Gas Boiler - Maintenance	25%	90%	3	2,039.9	$/bldg	346,700.0	2.07	0.01
Gas Furnace - Maintenance	25%	90%	3	337.5	$/bldg	26,400.0	1.09	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.1	$/sqft	4.2	2.50	0.03
Heat Pump - Maintenance	6%	95%	18	628.7	$/bldg	88,653.8	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	1.9	1.60	0.05
Ventilation - Variable Speed Control	1%	81%	15	0.2	$/sqft	1.1	0.65	0.07

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	1.7	0.89	0.02
Water Heater - Faucet Aerators	27%	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	1.0	0.14	0.11
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.9	2.35	0.01
Water Heater - Solar System	0%	25%	20	0.5	$/sqft	14.5	4.74	0.03
Water Heater - Install Timer	24%	29%	15	0.3	$/sqft	1.6	0.67	0.07
Water Heater - Pipe Insulation	24%	29%	12	952.1	$/bldg	4,924.1	0.44	0.08
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	1.0	2.30	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	6.3	0.68	0.06
Interior Lighting - Daylighting Controls	8%	13%	8	0.1	$/sqft	2.3	1.03	0.04
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	8.4	> 10	0.00
Interior Lighting - Occupancy Sensors	7%	56%	8	0.1	$/sqft	0.8	0.54	0.06
Interior Lighting - Task Lighting	18%	75%	5	0.2	$/sqft	0.8	0.08	0.15
Interior Lighting - Timeclocks and Timers	5%	56%	8	0.2	$/sqft	0.4	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.6	0.05	0.15
Interior Fluorescent - Delamp and Install Reflectors	15%	68%	11	0.5	$/sqft	0.7	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.15
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.7	1.10	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.8	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	0.2	0.08	0.10
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	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	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	0.5	0.01	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	0.1	0.04	0.15
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	13%	56%	5	723.6	$/bldg	4,922.0	0.12	0.10
Pool Pump - Timer	1%	34%	10	100.0	$/bldg	20,513.8	8.82	0.00
Pool Heater - Solar	0%	34%	15	3,500.0	$/bldg	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	1%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	10%	75%	15	4,221.5	$/bldg	899,536.2	> 10	0.00
Thermostat - Clock/Programmable	45%	50%	11	124.8	$/bldg	28,160.9	> 10	0.00
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	0.6	0.55	0.10
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	2.7	1.24	0.05
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	3.5	1.70	0.01
Retrocommissioning - HVAC	9%	24%	25	0.8	$/sqft	2.7	0.62	0.07
Retrocommissioning - Lighting	34%	39%	5	0.1	$/sqft	3.5	0.85	0.02
Advanced New Construction Designs	0%	0%	25	2.0	$/sqft	7.3	2.72	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.95	0.06
Refrigerator - eCube	5%	75%	12	0.1	$/sqft	0.2	0.22	0.09
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.92	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	1.4	$/sqft	0.9	0.35	0.09
Water Heating - Booster Water Heater	24%	29%	20	0.1	$/sqft	0.9	1.51	0.06
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	2%	49%	15	0.1	$/sqft	0.4	0.30	0.08
Boiler Parallel Positioning Control	2%	49%	15	1.7	$/sqft	0.4	0.02	0.11
Boiler blowdown heat exchanger (steam)	2%	49%	20	7.2	$/sqft	1.2	0.02	0.10
Repair malfunctioning steam traps	25%	90%	6	77.0	$/sqft	13,880.0	4.81	0.01
Insulate steam lines/condensate tank	24%	29%	12	1,302.0	$/bldg	0.4	0.00	0.13
Destratification Fans (HVLS)	1%	33%	12	2.4	$/sqft	2.6	0.07	0.12

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	1.2	$/sqft	2.9	0.12	0.11
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-81 Energy Efficiency Non-Equipment Data-Electric Miscellaneous, 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	11,311.1	$/bldg	181,658.7	1.61	0.04
Insulation - Ducting	8%	50%	20	0.8	$/sqft	1.0	0.38	0.09
Insulation - Radiant Barrier	7%	13%	20	2,890.2	$/bldg	75,566.7	2.55	0.03
Insulation - Wall Cavity	7%	13%	20	4,892.2	$/bldg	86,390.7	1.56	0.04
HVAC - Duct Repair and Sealing	25%	25%	18	9.0	$/bldg	1,766.5	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.6	1.18	0.04
Windows - High Efficiency	78%	83%	20	2,181.0	$/bldg	118,047.2	6.48	0.02
Roof - High Reflectivity	33%	95%	15	443.6	$/bldg	18,074.9	7.83	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	38%	49%	10	813.6	$/sqft	13,459.3	0.71	0.04
Air-Cooled Chiller - VSD on fans	15%	66%	15	339.0	$/bldg	1,287.8	9.26	0.08
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.2	0.80	0.04
Water-Cooled Chiller - Economizer	38%	49%	10	81.4	$/sqft	13,459.3	7.11	0.01
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	7.7	1.34	0.07
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
RTU - Evaporative Precooler	0%	7%	20	3.0	$/sqft	1.0	0.04	0.09
RTU - Maintenance	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.7	0.01	0.12
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400.0	1.11	0.00
Gas Boiler - Maintenance	22%	90%	3	2,039.9	$/bldg	228,900.0	0.13	0.01
Gas Furnace - Maintenance	22%	90%	3	337.5	$/bldg	57,700.0	0.19	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.1	$/sqft	7.7	3.56	0.02
Heat Pump - Maintenance	8%	95%	18	628.7	$/bldg	82,317.3	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.5	2.07	0.04
Ventilation - Variable Speed Control	3%	81%	15	0.2	$/sqft	1.4	0.84	0.06

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	2.45	0.02
Water Heater - Drainwater Heat Recovery	0%	50%	5	0.0	$/sqft	1.6	0.48	0.02
Water Heater - Faucet Aerators	31%	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	0.09	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.7	1.40	0.01
Water Heater - Solar System	0%	25%	20	0.5	$/sqft	13.7	3.14	0.03
Water Heater - Install Timer	30%	30%	15	0.3	$/sqft	1.6	0.44	0.07
Water Heater - Pipe Insulation	30%	30%	12	952.1	$/bldg	5,477.4	0.38	0.08
Water Heater - Tank Blanket/Insulation	0%	0%	10	0.0	$/sqft	0.9	1.25	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	4.8	0.05	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	2.3	0.99	0.04
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	0.8	0.52	0.06
Interior Lighting - Task Lighting	17%	75%	5	0.2	$/sqft	0.8	0.08	0.15
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.4	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.6	0.05	0.15
Interior Fluorescent - Delamp and Install Reflectors	11%	68%	11	0.5	$/sqft	0.7	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.04	0.15
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.7	1.07	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.8	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	0.1	0.03	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	0.00	0.15
Refrigerator - Evaporator Fan Controls	0%	8%	16	291.0	$/sqft	5,447.6	1.89	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	0.30	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	1.39	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	0.5	0.01	0.18
Grocery - ECMs for Display Cases	0%	0%	15	50.0	$/sqft	4,570.0	8.49	0.01
Grocery - Open Display Case - Night Covers	0%	0%	8	0.1	$/sqft	0.1	0.04	0.15
Cooking - Exhaust Hoods with Sensor Control	1%	15%	15	1,494.0	$/bldg	51,124.9	3.54	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	723.6	$/bldg	4,922.0	0.12	0.10
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.59	0.04
Energy Management System	14%	75%	15	4,221.5	$/bldg	531,443.5	9.88	0.01
Thermostat - Clock/Programmable	50%	50%	11	124.8	$/bldg	31,203.8	> 10	0.00
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	0.5	0.49	0.11
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.4	1.09	0.06
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	3.5	1.65	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.4	0.55	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.5	0.83	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	6.5	2.40	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	2.24	0.06
Refrigerator - eCube	5%	75%	12	0.1	$/sqft	0.2	0.21	0.09
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.71	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.8	1.32	0.08
Water Heating - Booster Water Heater	30%	30%	20	0.1	$/sqft	0.9	1.44	0.06
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	38%	49%	15	0.1	$/sqft	0.3	0.02	0.09
Boiler Parallel Positioning Control	38%	49%	15	1.7	$/sqft	0.3	0.00	0.11
Boiler blowdown heat exchanger (steam)	38%	49%	20	7.2	$/sqft	0.9	0.00	0.10
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	0.47	0.01
Insulate steam lines/condensate tank	30%	30%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	3%	33%	12	2.4	$/sqft	3.2	0.01	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)
Exhaust Hood Makeup Air	1%	15%	10	1.2	$/sqft	3.5	0.01	0.11
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

Table C-82 Energy Efficiency Non-Equipment Data-Natural Gas Miscellaneous, 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	11,311.1	$/bldg	181,658.7	2.27	0.04
Insulation - Ducting	8%	50%	20	0.8	$/sqft	1.0	0.38	0.09
Insulation - Radiant Barrier	7%	13%	20	2,890.2	$/bldg	75,566.7	3.54	0.03
Insulation - Wall Cavity	7%	13%	20	4,892.2	$/bldg	86,390.7	2.26	0.04
HVAC - Duct Repair and Sealing	25%	25%	18	9.0	$/bldg	1,766.5	> 10	0.00
Doors - High Efficiency	100%	100%	10	0.2	$/sqft	2.6	1.18	0.04
Windows - High Efficiency	78%	83%	20	2,181.0	$/bldg	118,047.2	8.37	0.02
Roof - High Reflectivity	33%	95%	15	443.6	$/bldg	18,074.9	7.83	0.02
Air-Cooled Chiller - Condenser Air Temperature Reset	60%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Air-Cooled Chiller - Economizer	38%	49%	10	813.6	$/sqft	13,459.3	0.71	0.04
Air-Cooled Chiller - VSD on fans	15%	66%	15	339.0	$/bldg	1,287.8	9.26	0.08
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516.0	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.2	0.80	0.04
Water-Cooled Chiller - Economizer	38%	49%	10	81.4	$/sqft	13,459.3	7.11	0.01
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	7.7	1.34	0.07
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775.5	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798.4	0.43	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	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
RTU - Evaporative Precooler	0%	7%	20	3.0	$/sqft	1.0	0.04	0.09
RTU - Maintenance	36%	90%	18	1,247.6	$/bldg	61,222.3	> 10	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	0.7	0.09	0.12
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400.0	> 10	0.00
Gas Boiler - Maintenance	22%	90%	3	2,039.9	$/bldg	228,900.0	1.57	0.01
Gas Furnace - Maintenance	22%	90%	3	337.5	$/bldg	57,700.0	2.37	0.01
Space Heating - Heat Recovery Ventilator	44%	49%	15	0.1	$/sqft	7.7	4.47	0.02
Heat Pump - Maintenance	8%	95%	18	628.7	$/bldg	82,317.3	> 10	0.01
Ventilation - ECM on VAV Boxes	0%	0%	18	0.2	$/sqft	2.5	2.09	0.04
Ventilation - Variable Speed Control	3%	81%	15	0.2	$/sqft	1.4	0.85	0.06

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	1.6	0.86	0.02
Water Heater - Faucet Aerators	31%	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	0.14	0.12
Water Heater - Desuperheater	0%	10%	5	0.0	$/sqft	3.7	2.26	0.01
Water Heater - Solar System	0%	25%	20	0.5	$/sqft	13.7	4.57	0.03
Water Heater - Install Timer	30%	30%	15	0.3	$/sqft	1.6	0.65	0.07
Water Heater - Pipe Insulation	30%	30%	12	952.1	$/bldg	5,477.4	0.48	0.08
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	4.8	0.57	0.07
Interior Lighting - Daylighting Controls	19%	19%	8	0.1	$/sqft	2.3	1.03	0.04
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	0.8	0.54	0.06
Interior Lighting - Task Lighting	17%	75%	5	0.2	$/sqft	0.8	0.08	0.15
Interior Lighting - Timeclocks and Timers	56%	56%	8	0.2	$/sqft	0.4	0.09	0.14
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	0.6	0.05	0.15
Interior Fluorescent - Delamp and Install Reflectors	11%	68%	11	0.5	$/sqft	0.7	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/sqft	0.3	0.05	0.15
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.7	1.10	0.03
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.8	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	0.1	0.04	0.11
Refrigerator - Door Gasket Replacement	5%	75%	8	0.1	$/sqft	0.2	0.06	0.14
Refrigerator - Economizer	10%	38%	10	406.8	$/sqft	0.4	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	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	0.5	0.01	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	0.1	0.04	0.15
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	13%	56%	5	723.6	$/bldg	4,922.0	0.12	0.10
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	0.0	0.00	0.11
Non-HVAC Motors - Variable Speed Control	0%	38%	10	199.3	$/bldg	3,749.5	1.60	0.04
Energy Management System	14%	75%	15	4,221.5	$/bldg	531,443.5	> 10	0.01
Thermostat - Clock/Programmable	50%	50%	11	124.8	$/bldg	31,203.8	> 10	0.00
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	0.5	0.49	0.11
Commissioning - HVAC	75%	75%	25	0.4	$/sqft	2.4	1.09	0.06
Commissioning - Lighting	60%	75%	5	0.0	$/sqft	3.5	1.70	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	2.4	0.55	0.07
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	3.5	0.85	0.02
Advanced New Construction Designs	5%	75%	25	2.0	$/sqft	6.5	2.40	0.07
Custom Measures	10%	45%	15	1.5	$/sqft	11.4	1.92	0.06
Refrigerator - eCube	5%	75%	12	0.1	$/sqft	0.2	0.22	0.09
Electronics - Smart Power Strip	13%	56%	7	0.0	$/sqft	0.0	2.92	0.01
Electronics - Monitor Power Management	10%	95%	5	0.0	$/sqft	0.3	> 10	0.00
Insulation - Foundation	7%	13%	20	0.3	$/sqft	0.8	1.32	0.08
Water Heating - Booster Water Heater	30%	30%	20	0.1	$/sqft	0.9	1.44	0.06
Refrigeration - High Efficiency Evaporator Fan Motors	0%	8%	15	0.0	$/sqft	1.6	> 10	0.00
Boiler O2 Trim Controls	38%	49%	15	0.1	$/sqft	0.3	0.26	0.09
Boiler Parallel Positioning Control	38%	49%	15	1.7	$/sqft	0.3	0.02	0.11
Boiler blowdown heat exchanger (steam)	38%	49%	20	7.2	$/sqft	0.9	0.02	0.10
Repair malfunctioning steam traps	22%	90%	6	77.0	$/sqft	13,880.0	5.58	0.01
Insulate steam lines/condensate tank	30%	30%	12	1,302.0	$/bldg	0.3	0.00	0.13
Destratification Fans (HVLS)	3%	33%	12	2.4	$/sqft	3.2	0.10	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)
Exhaust Hood Makeup Air	1%	15%	10	1.2	$/sqft	3.5	0.17	0.11
Optimizing Kitchen Ventilation	0%	0%	1	1.0	$/sqft	-	0.00	-

INDUSTRIAL ENERGY EFFICIENCY EQUIPMENT AND MEASURE DATA

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

Table D-1 and Table D-2 provide brief narrative descriptions for the measures.[1]

Table D-3 through

[1] Measure Description Source: EnerNOC internal databases

Table D-22 list the detailed unit-level data (including economic screen results) for industrial energy-efficiency 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 D-23 through Table D-42 list the detailed unit-level data (including economic screen results) for industrial energy-efficiency non-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 D-1 Industrial 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	Other Cooling	Miscellaneous Cooling
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 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.
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.
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, industrial lighting efficiency changes typically require more than the simple purchase and installation of 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, industrial lighting efficiency changes typically require more than the simple purchase and installation of 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 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.
Process	Process Electrochemical	Electrochemical processes deal with chemical reactions in solution driven by electricity applied at a cathode and anode.
Process	Other Process	This category is a "catch all" for the many unique process applications in the broader industrial sector.
Process	Process Cooling	Industrial process where cooling is applied
Process	Process Refrigeration	Industrial refrigeration process
Process	Process Heating	Industrial process where heating is applied
Process	Process Boiler	Boilers heat water, providing either hot water or steam to be distributed around the building for heating. Steam is distributed via pipes to steam radiators, and hot water can be distributed via baseboard radiators or radiant floor systems, or can heat air via a coil. 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.
Process	Other Process	This category is a "catch all" for the many unique process applications in the broader industrial sector.
Motors	Pumps, Fans & Blowers, Compressed Air, Conveyors, Material Handling, Material Processing	Premium efficiency motors reduce the amount of lost energy going into heat rather than power. Since less heat is generated, less energy is needed to cool the motor with a fan. The initial cost of energy efficient motors is generally higher than for standard motors, however their life-cycle costs can make them far more economical because of savings they generate in operating expense. The fact that energy efficient motors run cooler than their standard counterparts also results in an increase in the life of the motor insulation and bearing. High efficiency units use copper instead of aluminum in the windings and increased conductor cross-sectional area to lower a motor's I2R losses.
Miscellaneous	Miscellaneous	Improvement of miscellaneous electric uses.

Table D-2 Industrial 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 - 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.
Air-Cooled Chiller	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.
Air-Cooled Chiller	Air-Cooled Chiller - Efficient Mechanical Layout	Improvements to layout and placement of chiller equipment, for example to enable unobstructed access to cooling tower airflow or minimize the length of refrigerant run between cooling tower and chiller head unit.
Air-Cooled Chiller	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.
Air-Cooled Chiller	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.
Air-Cooled Chiller	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.
Air-Cooled Chiller	Air-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.
Air-Cooled Chiller	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.
Air-Cooled Chiller	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.
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-Efficient Mechanical Layout	Improvements to layout and placement of chiller equipment, for example to enable unobstructed access to cooling tower airflow or minimize the length of refrigerant run between cooling tower and chiller head unit.
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.
Water-Cooled Chiller	Water 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.
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 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 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.
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.
Roof Top AC	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%.
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%.
Process	Process Boilers- Hot Water Reset	Automatic control algorithm for boilers that varies the water temperature of the supply loop in a manner that is tailored to the heating demand of the process at hand.
Process	Process Boilers- Combustion Controls	Operating your boiler with an optimum amount of excess air will minimize heat loss up the stack and improve combustion efficiency. When fuel composition is

	(O2 Trim)	highly variable (such as refinery gas, hog fuel, or multi-fuel boilers), or where steam flows are highly variable, an online oxygen analyzer should be considered. The oxygen "trim" system provides feedback to the burner controls to automatically minimize excess combustion air and optimize the air-to-fuel ratio.
Process	Process Boiler-Condensate Return Lines	Hot condensate that comes out of the steam being delivered can be returned directly to the boiler, where it is then much easier to reheat than cold makeup water. Other benefits that will accrue from an efficient condensate return system are less make-up water, water related treatment costs, boiler blowdown, and disposal costs.
Process	Process Boiler-Condensing Economizer	A boiler economizer recovers heat from the boiler exhaust gas and is used to pre-heat the boiler feed water. Capturing this heat reduces overall fuel requirements for the boiler. A condensing economizer extracts additional heat from the exhaust gas by taking its water vapor all the way to a liquid water state
Process	Process Boiler- 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.
Process	Process- Boiler Steam Trap Maintenance	Steam transfers its latent heat to a process fluid in a heat exchanger. The steam is held in the heat exchanger by a steam trap until it condenses. Then the trap passes the condensate into the condensate return system. Heat loss through uninsulated or leaky lines and fittings in the steam traps can be significant, and is easily prevented with regular inspections, maintenance, and repair. General experience shows that most facilities, however, do not have such practices.
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	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	Gas 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	Gas 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.
Heating	Boiler Blowdown 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	Insulate steam lines/condensate tank	Insulation to prevent heat loss from steam lines and condensate tank
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)	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.
HVAC (All)	HVAC- Infrared Heater	Infrared heater low intensity - two stage
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 - Skylights	Addition of transparent windows/fixtures in the roof to allow daylight to enter and reduce the need for powered lighting.
Interior Lighting	Interior Lighting - Time Clocks 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 - 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 - Daylighting Controls	Daylighting controls use a photosensor to detect ambient light and adjust or turn off electric lights accordingly.
Interior Lighting	Interior Screw-in - 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	Exterior Lighting - Bi-	Bi-level fixtures have the ability to reduce light output to a lower level, given a

Lighting	Level Fixture	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.
Process	Process - Conductivity Controls	Automated control of conductivity levels in a process solution, for example by variably injecting CO2 into a stream of rinse water, can maintain an optimal solution that increases process effectiveness, decreases impurities, reduces scaling or corrosion, and minimizes required rinse time.
Process	Process - Controls on Fume Hoods	Improved fume hoods involve installing sensors and variable-speed controls to provide ventilation based on actual demand. When the relevant equipment or process is not active, the controls automatically decrease the fan speed accordingly.
Process	Process - Timers and Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.
Refrigeration	Refrigeration - 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	Refrigeration - System Controls	Refrigeration System Controls would include measures such as temperature sensors, flow/float controls, and pressure controls. These work to improve the refrigeration system by limiting demand and improving overall system efficiency.
Refrigeration	Refrigeration - System 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.
Refrigeration	Refrigeration - System Optimization	Refrigeration system optimization is a thorough overhaul of the refrigeration system which involves the resizing, sequencing, and controlling of compressors in order to optimize load.
Compressed Air	Compressed Air - Air Usage Reduction	This measure involves a process audit of the facility to determine if the actual application of compressed air can be reduced, reconfigured, consolidated, or otherwise optimized.
Compressed Air	Compressed Air - Compressor Replacement	This measure is the replacement of existing air compressor equipment with more efficient compressors and motors in order to improve energy efficiency.
Compressed Air	Compressed Air - System Controls	Compressed Air System Controls would include measures such as VSDs, centralized controls, and system performance monitoring. These measures work in tandem to reduce energy usage by lowering system demand.
Compressed Air	Compressed Air - System Maintenance	This measure includes repairing holes in air lines, replacing failed nozzles, and lubricating the compressors. This reduces energy consumption by improving compressor efficiency and reducing line loss as gas moves through the system.
Compressed Air	Compressed Air - System Optimization and Improvements	System optimization is a thorough overhaul of the compressed air system which involves the resizing, sequencing, and improving control over all compressors in a system in order to reduce energy consumption to a minimum. This measure may include those from Controls and Maintenance.
Pumps	Pumping System - Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.

Pumps	Pumping System - Maintenance	This measure includes clearing traps, repairing impellers, and repairing broken seals or valves. This reduces energy consumption by reducing losses incurred by moving fluids through the system.
Pumps	Pumping System - Optimization	Optimization integrates best practices of system analysis, equipment improvements, and operational improvements into a sustaining energy program. A facility that implements such a practice treats its energy program in a similar manner to safety or quality control programs: an individual or team is tasked with developing and enforcing standards, goals are set, regular reports are generated and reported to management, and all plant employees are engaged and held accountable.
Pumps	Pumps - Variable Speed Control	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.
Pumps	Pump Equipment Upgrade	Improved design of flow, housing, control valves, impeller trimming, proper sizing, etc to increase productive output per energy input. Moreover, these improved systems could be assessed and managed in accordance with recognized standards such as ASME EA-2-2008.
Fans & Blowers	Fan Equipment Upgrade	Improved design of airflow, blades, housing, sizing, etc to increase productive output per energy input. Fans are widely used in industry for conveyance, drying and ventilation. For example, relatively inefficient centrifugal-radial fans, with efficiency as low as 22%, are commonly used in industry. These fans could be replaced with more efficient centrifugal backwardly inclined fans that increase overall fan efficiency by 20% to 30%. The savings potential for premium-efficiency fans is high, and the costs are relatively low. However, premium-efficiency fans are sometimes not chosen for industrial applications because of concerns about reliable operation in dirty environments.
Fans & Blowers	Fan System - Controls	Significant energy savings can frequently be attained from processes by adding a timer or altering their control algorithms.
Fans & Blowers	Fan System - Maintenance	This measure includes repairing holes in ducts, replacing clogged filters, and lubricating the motors. This reduces energy consumption by improving fan efficiency and reducing system loss as gas moves through the ductwork.
Fans & Blowers	Fan System - Optimization	Optimization integrates best practices of system analysis, equipment improvements, and operational improvements into a sustaining energy program. A facility that implements such a practice treats its energy program in a similar manner to safety or quality control programs: an individual or team is tasked with developing and enforcing standards, goals are set, regular reports are generated and reported to management, and all plant employees are engaged and held accountable.
Fans & Blowers	Fans - Variable Speed Control	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.
Motors	Motors - Magnetic Adjustable Speed Drives	To allow for adjustable speed operation, this technology uses magnetic induction to couple a drive to its load. Varying the magnetic slip within the coupling controls the speed of the output shaft. Magnetic drives perform best at the upper end of the speed range due to the energy consumed by the slip. Unlike traditional ASDs, magnetically coupled ASDs create no power distortion on the electrical system. However, magnetically coupled ASD efficiency is best when power needs are greatest. VFDs may show greater efficiency when the average load speed is below 90% of the motor speed, however this occurs when power demands are reduced.
Motors	Motors - Efficient Rewind	When a motor burns out or is in need of repair, the owner may elect to either replace the motor or have it rewound. A typical motor rewind costs less than a replacement motor, but at the cost of efficiency. An efficient rewind, however, attempts to improve the efficiency of the motor by reducing stator losses. If

		the manufacturer has left stator slots open, or not entirely filled, additional copper wire can be included to reduce resistance and increase efficiency.
Motors	Motors - Variable Frequency Drive	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.
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.
Ventilation	Ventilation - CO2 Controlled	Also known as Demand Controlled Ventilation, this measure uses carbon dioxide (CO2) levels to indicate the level of occupancy in a space. Sensors monitor CO2 levels so that air handling controls can adjust the amount of outside air the system needs to intake. Ventilation rates are thereby controlled based on occupancy, rather than a fixed rate, thus saving HVAC energy use.
All	Transformer - High Efficiency	All electric power passes through one or more transformers on its way to service equipment, lighting, and other loads. Currently available materials and designs can considerably reduce both load and no-load losses. The new NEMA TP-1 standard is used as the reference definition for energy -efficient products. Tier-1 represents TP-1 dry-type transformers while Tier-2 reflects a switch to liquid immersed TP-1 products. More efficient transformers with attractive payback periods are estimated to save 40 to 50 percent of the energy lost by a "typical" transformer, which translates into a one to three percent reduction in electric bills for commercial and industrial customers.
All	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.
Miscellaneous	Direct Fired Make-up Air System	Heating of make-up air with direct contact with combustion flame in spaces that require high ventilation rates.
Miscellaneous	Direct Contact Water Heater	Incoming water flows downward through a vertical column filled with stainless steel packing rings. As cold water comes into Direct Contact with rising hot combustion air from a gas burner, a very rapid heat transfer occurs, absorbing 99% of the heat energy into the water. Pure, heated water then accumulates in the storage tank for "On Demand" use, and clean CO2 and H20 combustion gas leaves the stack at near ambient temperature.

Table D-3 Energy Efficiency Equipment Data, Electric-Food Products, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	614.19	$227.87	20	6.32	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	737.02	$257.47	20	6.71	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1,535.46	$287.08	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1,627.59	$316.68	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	1,267.56	$180.24	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,437.01	$193.11	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,691.39	$231.74	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	2,030.44	$360.48	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	2,115.37	$399.10	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,285.29	$437.73	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	739.38	$266.78	16	-	$0.04
Cooling	Roof top AC	EER 11.2	1,481.67	$307.82	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	1,936.05	$985.03	16	1.28	$0.05
Cooling	Roof top AC	Ductless Minisplit	2,425.37	$3,232.13	16	0.62	$0.13
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	812.78	$337.72	16	-	$0.04
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	1,293.80	$42.21	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1,717.26	$1,245.33	16	0.71	$0.07
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1,883.61	$1,846.88	16	0.66	$0.10
Cooling	Air Source Heat Pump	Ductless Minisplit	2,382.68	$3,113.31	16	0.72	$0.13
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	515.37	$782.55	16	1.34	$0.15
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	940.33	$1,606.29	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	2,300.19	$2,188.39	16	2.13	$0.09
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	135.48	$3,427.99	16	-	$2.50
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	210.67	$428.50	16	1.00	$0.20
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	272.70	$12,640.70	16	0.00	$4.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	296.60	$18,746.80	16	0.00	$6.26
Heating	Air Source Heat Pump	Ductless Minisplit	362.44	$31,601.74	16	0.00	$8.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	476.55	$7,029.84	16	0.04	$1.46
Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,097.33	$14,429.67	16	0.04	$1.30
Heating	Geothermal Heat Pump	EER 30, COP 5.0	2,009.87	$19,658.75	16	0.06	$0.97
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	218.52	$8.25	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	335.72	$11.35	3	-	$0.01
Interior Lighting	Screw-in	CFL	628.50	$4.13	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	685.39	$68.23	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	785.07	$19.08	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	44.65	$21.23	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	45.46	($1.41)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	48.37	$0.72	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	53.35	$19.55	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	56.61	$1.44	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	58.02	$1.55	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	86.73	$4.55	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	335.37	$907.67	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	348.99	($0.13)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	484.15	$132.86	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	561.23	$100.96	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,046.30	$249.72	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.34	$0.01	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.52	$0.02	3	-	$0.01
Exterior Lighting	Screw-in	CFL	0.97	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.06	$0.26	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	1.22	$0.07	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	149.36	$190.40	15	0.14	$0.13
Exterior Lighting	HID	T8	153.45	($4.77)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	163.28	$2.42	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	191.09	$4.87	15	1.00	$0.00
Exterior Lighting	HID	T5	195.86	$5.22	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	288.07	$49.07	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.03	$0.07	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.03	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.04	$0.01	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.04	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.08	$0.02	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	19.43	$16.07	10	0.48	$0.11
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	14.35	$13.71	10	0.42	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	6.91	$4.19	10	0.66	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	12.04	$12.65	10	0.38	$0.14
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	17.10	$17.97	10	0.38	$0.14
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	-	-	10	-	-
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-

Table D-4 Energy Efficiency Equipment Data, Natural Gas-Food Products, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	10.24	$240.90	20	0.30	$2.08
Heating	Furnace	EF .82	14.99	$651.75	20	0.16	$3.84
Heating	Furnace	EF .90	31.81	$569.22	20	0.39	$1.58
Heating	Furnace	EF .96	42.70	$826.64	20	0.36	$1.71
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	134.87	$187.80	25	1.00	$0.11
Heating	Boiler	EF .83	227.50	$1,108.03	25	0.84	$0.39
Heating	Boiler	EF .90	419.60	$1,690.21	25	1.58	$0.32
Heating	Boiler	EF .96	485.58	$2,904.66	25	1.08	$0.48
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	10.73	$5.20	15	-	$0.05
Heating	Other Heating	AFUE .76	13.25	$7.44	15	1.00	$0.06
Heating	Other Heating	AFUE .77	15.77	$11.60	15	3.31	$0.08
Heating	Other Heating	AFUE .80	22.71	$23.64	15	3.19	$0.11
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	78.15	$108.82	25	1.00	$0.11
Process	Process Boiler	EF .83	131.82	$642.04	25	0.84	$0.39
Process	Process Boiler	EF .90	243.13	$979.38	25	1.58	$0.32
Process	Process Boiler	EF .96	281.36	$1,683.08	25	1.08	$0.48
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-5 Energy Efficiency Equipment Data, Electric-Food Products, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	549.31	$323.41	20	3.98	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	659.16	$365.42	20	4.23	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	1,373.28	$407.44	20	7.90	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	1,455.66	$449.46	20	7.59	$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	1,185.72	$277.95	20	10.00	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	1,344.21	$297.81	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,582.16	$357.37	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1,898.48	$555.91	20	8.00	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1,977.93	$615.47	20	7.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	2,136.89	$675.03	20	7.42	$0.03
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	711.23	$296.65	16	-	$0.04
Cooling	Roof top AC	EER 11.2	1,425.64	$342.29	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	1,862.72	$1,095.34	16	1.11	$0.06
Cooling	Roof top AC	Ductless Minisplit	2,333.50	$3,594.07	16	0.53	$0.15
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	702.63	$326.86	16	-	$0.05
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	1,118.24	$40.86	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1,484.47	$1,205.30	16	0.64	$0.08
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1,628.26	$1,787.53	16	0.59	$0.11
Cooling	Air Source Heat Pump	Ductless Minisplit	2,059.88	$3,013.26	16	0.64	$0.14
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	453.34	$770.67	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	827.14	$1,581.90	16	1.06	$0.19
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	2,023.32	$2,155.15	16	1.90	$0.11
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	121.70	$1,652.52	16	-	$1.34
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	189.24	$206.57	16	1.00	$0.11
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	244.96	$6,093.67	16	0.01	$2.46
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	266.43	$9,037.23	16	0.00	$3.36
Heating	Air Source Heat Pump	Ductless Minisplit	325.57	$15,234.18	16	0.00	$4.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	443.47	$3,475.29	16	0.07	$0.78
Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,021.14	$7,133.50	16	0.08	$0.69
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,925.20	$9,718.57	16	0.11	$0.50
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	218.52	$8.25	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	335.72	$11.35	3	-	$0.01
Interior Lighting	Screw-in	CFL	628.50	$4.13	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	685.39	$68.23	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	785.07	$19.08	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	44.65	$21.23	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	45.46	($1.41)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	48.37	$0.72	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	53.35	$19.55	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	56.61	$1.44	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	58.02	$1.55	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	86.73	$4.55	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	335.37	$907.67	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	348.99	($0.13)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	484.15	$132.86	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	561.23	$100.96	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,046.30	$249.72	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.34	$0.01	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.52	$0.02	3	-	$0.01
Exterior Lighting	Screw-in	CFL	0.97	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.06	$0.26	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	1.22	$0.07	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	149.36	$190.40	15	0.14	$0.13
Exterior Lighting	HID	T8	153.45	($4.77)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	163.28	$2.42	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	191.09	$4.87	15	1.00	$0.00
Exterior Lighting	HID	T5	195.86	$5.22	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	288.07	$49.07	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.03	$0.07	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.03	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.04	$0.01	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.04	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.08	$0.02	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	19.43	$16.87	10	0.46	$0.12
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	14.35	$14.39	10	0.40	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	6.91	$4.40	10	0.63	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	12.04	$13.28	10	0.36	$0.15
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	17.10	$18.86	10	0.36	$0.15
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	-	-	10	-	-
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-6 Energy Efficiency Equipment Data, Natural Gas-Food Products, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	9.46	$102.95	20	0.64	$0.96
Heating	Furnace	EF .82	13.84	$278.54	20	0.35	$1.78
Heating	Furnace	EF .90	29.42	$243.26	20	0.84	$0.73
Heating	Furnace	EF .96	39.40	$353.28	20	0.78	$0.79
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	123.00	$204.04	25	1.00	$0.13
Heating	Boiler	EF .83	207.47	$1,203.83	25	0.71	$0.47
Heating	Boiler	EF .90	382.67	$1,836.35	25	1.33	$0.39
Heating	Boiler	EF .96	442.87	$3,155.80	25	0.91	$0.57
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	9.71	$4.21	15	-	$0.04
Heating	Other Heating	AFUE .76	11.99	$6.02	15	1.00	$0.05
Heating	Other Heating	AFUE .77	14.27	$9.39	15	3.70	$0.07
Heating	Other Heating	AFUE .80	20.55	$19.14	15	3.56	$0.10
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	71.54	$118.68	25	1.00	$0.13
Process	Process Boiler	EF .83	120.68	$700.21	25	0.71	$0.47
Process	Process Boiler	EF .90	222.58	$1,068.12	25	1.33	$0.39
Process	Process Boiler	EF .96	257.60	$1,835.58	25	0.91	$0.57
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-7 Energy Efficiency Equipment Data, Electric-Petroleum, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	2,760.39	$1,024.12	20	6.32	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	3,312.46	$1,157.18	20	6.71	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	6,900.94	$1,290.23	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	7,314.99	$1,423.29	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	5,696.89	$810.06	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	6,458.48	$867.93	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	7,601.73	$1,041.51	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	9,125.55	$1,620.13	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	9,507.26	$1,793.71	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	10,270.92	$1,967.30	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	3,323.03	$1,199.00	16	-	$0.04
Cooling	Roof top AC	EER 11.2	6,659.19	$1,383.47	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	8,701.35	$4,427.09	16	1.28	$0.05
Cooling	Roof top AC	Ductless Minisplit	10,900.52	$14,526.39	16	0.62	$0.13
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	3,652.96	$1,517.82	16	-	$0.04
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	5,814.80	$189.73	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	7,717.99	$5,596.96	16	0.71	$0.07
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	8,465.66	$8,300.57	16	0.66	$0.10
Cooling	Air Source Heat Pump	Ductless Minisplit	10,708.65	$13,992.39	16	0.72	$0.13
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	2,316.28	$3,517.08	16	1.34	$0.15
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	4,226.19	$7,219.28	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	10,337.91	$9,835.43	16	2.13	$0.09
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	608.91	$15,406.64	16	-	$2.50
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	946.84	$1,925.83	16	1.00	$0.20
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	1,225.60	$56,812.00	16	0.00	$4.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	1,333.05	$84,255.08	16	0.00	$6.26
Heating	Air Source Heat Pump	Ductless Minisplit	1,628.94	$142,029.99	16	0.00	$8.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	2,141.81	$31,594.71	16	0.04	$1.46
Heating	Geothermal Heat Pump	EER 18, COP 3.8	4,931.80	$64,852.30	16	0.04	$1.30
Heating	Geothermal Heat Pump	EER 30, COP 5.0	9,033.08	$88,353.73	16	0.06	$0.97
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	771.66	$29.14	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	1,185.54	$40.07	3	-	$0.01
Interior Lighting	Screw-in	CFL	2,219.44	$14.59	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	2,420.34	$240.93	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	2,772.35	$67.37	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	157.68	$74.96	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	160.53	($4.99)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	170.82	$2.53	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	188.38	$69.03	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	199.90	$5.09	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	204.90	$5.46	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	306.29	$16.07	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1,184.29	$3,205.26	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	1,232.40	($0.47)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1,709.68	$469.19	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1,981.90	$356.52	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	3,694.82	$881.85	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	1.20	$0.05	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	1.84	$0.06	3	-	$0.01
Exterior Lighting	Screw-in	CFL	3.44	$0.02	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	3.73	$0.94	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	4.30	$0.26	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	527.44	$672.38	15	0.14	$0.13
Exterior Lighting	HID	T8	541.89	($16.85)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	576.61	$8.53	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	674.80	$17.19	15	1.00	$0.00
Exterior Lighting	HID	T5	691.65	$18.43	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	1,017.27	$173.26	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.09	$0.25	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.10	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.13	$0.04	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.15	$0.03	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.29	$0.07	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	427.31	$353.51	10	0.48	$0.11
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	174.54	$166.74	10	0.42	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	171.99	$104.22	10	0.66	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	-	-	10	-	-
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	465.94	$489.59	10	0.38	$0.14
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	93.19	$97.92	10	0.38	$0.14
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-8 Energy Efficiency Equipment Data, Natural Gas-Petroleum, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	10.40	$244.57	20	0.30	$2.08
Heating	Furnace	EF .82	15.22	$661.68	20	0.16	$3.84
Heating	Furnace	EF .90	32.30	$577.89	20	0.39	$1.58
Heating	Furnace	EF .96	43.35	$839.23	20	0.36	$1.71
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	136.93	$190.66	25	1.00	$0.11
Heating	Boiler	EF .83	230.96	$1,124.91	25	0.84	$0.39
Heating	Boiler	EF .90	425.99	$1,715.96	25	1.58	$0.32
Heating	Boiler	EF .96	492.98	$2,948.91	25	1.08	$0.48
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	10.89	$5.28	15	-	$0.05
Heating	Other Heating	AFUE .76	13.45	$7.55	15	1.00	$0.06
Heating	Other Heating	AFUE .77	16.01	$11.78	15	3.31	$0.08
Heating	Other Heating	AFUE .80	23.06	$24.01	15	3.19	$0.11
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	202.70	$282.25	25	1.00	$0.11
Process	Process Boiler	EF .83	341.91	$1,665.28	25	0.84	$0.39
Process	Process Boiler	EF .90	630.63	$2,540.26	25	1.58	$0.32
Process	Process Boiler	EF .96	729.79	$4,365.49	25	1.08	$0.48
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-9 Energy Efficiency Equipment Data, Electric-Petroleum, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	2,468.80	$1,453.50	20	3.98	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	2,962.53	$1,642.35	20	4.23	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	6,172.02	$1,831.19	20	7.90	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	6,542.30	$2,020.03	20	7.59	$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	5,329.05	$1,249.23	20	10.00	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	6,041.38	$1,338.46	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	7,110.80	$1,606.15	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	8,532.47	$2,498.46	20	8.00	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	8,889.57	$2,766.15	20	7.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	9,603.98	$3,033.84	20	7.42	$0.03
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	3,196.53	$1,333.27	16	-	$0.04
Cooling	Roof top AC	EER 11.2	6,407.37	$1,538.39	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	8,371.74	$4,922.85	16	1.11	$0.06
Cooling	Roof top AC	Ductless Minisplit	10,487.64	$16,153.09	16	0.53	$0.15
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	3,157.86	$1,469.04	16	-	$0.05
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	5,025.80	$183.63	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	6,671.76	$5,417.08	16	0.64	$0.08
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	7,318.01	$8,033.80	16	0.59	$0.11
Cooling	Air Source Heat Pump	Ductless Minisplit	9,257.85	$13,542.69	16	0.64	$0.14
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	2,037.47	$3,463.67	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	3,717.50	$7,109.65	16	1.06	$0.19
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	9,093.57	$9,686.07	16	1.90	$0.11
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	546.97	$7,427.05	16	-	$1.34
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	850.53	$928.38	16	1.00	$0.11
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	1,100.93	$27,387.23	16	0.01	$2.46
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	1,197.46	$40,616.66	16	0.00	$3.36
Heating	Air Source Heat Pump	Ductless Minisplit	1,463.25	$68,468.08	16	0.00	$4.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	1,993.10	$15,619.27	16	0.07	$0.78
Heating	Geothermal Heat Pump	EER 18, COP 3.8	4,589.37	$32,060.60	16	0.08	$0.69
Heating	Geothermal Heat Pump	EER 30, COP 5.0	8,652.56	$43,678.85	16	0.11	$0.50
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	771.66	$29.14	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	1,185.54	$40.07	3	-	$0.01
Interior Lighting	Screw-in	CFL	2,219.44	$14.59	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	2,420.34	$240.93	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	2,772.35	$67.37	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	157.68	$74.96	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	160.53	($4.99)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	170.82	$2.53	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	188.38	$69.03	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	199.90	$5.09	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	204.90	$5.46	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	306.29	$16.07	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	1,184.29	$3,205.26	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	1,232.40	($0.47)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	1,709.68	$469.19	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	1,981.90	$356.52	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	3,694.82	$881.85	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	1.20	$0.05	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	1.84	$0.06	3	-	$0.01
Exterior Lighting	Screw-in	CFL	3.44	$0.02	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	3.73	$0.94	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	4.30	$0.26	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	527.44	$672.38	15	0.14	$0.13
Exterior Lighting	HID	T8	541.89	($16.85)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	576.61	$8.53	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	674.80	$17.19	15	1.00	$0.00
Exterior Lighting	HID	T5	691.65	$18.43	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	1,017.27	$173.26	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.09	$0.25	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.10	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.13	$0.04	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.15	$0.03	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.29	$0.07	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	427.31	$371.09	10	0.46	$0.12
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	174.54	$175.03	10	0.40	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	171.99	$109.41	10	0.63	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	-	-	10	-	-
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	465.94	$513.94	10	0.36	$0.15
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	93.19	$102.79	10	0.36	$0.15
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-10 Energy Efficiency Equipment Data, Natural Gas-Petroleum, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	9.60	$104.52	20	0.64	$0.96
Heating	Furnace	EF .82	14.05	$282.78	20	0.35	$1.78
Heating	Furnace	EF .90	29.87	$246.97	20	0.84	$0.73
Heating	Furnace	EF .96	40.00	$358.66	20	0.78	$0.79
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	124.87	$207.15	25	1.00	$0.13
Heating	Boiler	EF .83	210.63	$1,222.17	25	0.71	$0.47
Heating	Boiler	EF .90	388.50	$1,864.33	25	1.33	$0.39
Heating	Boiler	EF .96	449.62	$3,203.88	25	0.91	$0.57
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	9.85	$4.28	15	-	$0.04
Heating	Other Heating	AFUE .76	12.17	$6.11	15	1.00	$0.05
Heating	Other Heating	AFUE .77	14.49	$9.53	15	3.70	$0.07
Heating	Other Heating	AFUE .80	20.87	$19.43	15	3.56	$0.10
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	185.57	$307.83	25	1.00	$0.13
Process	Process Boiler	EF .83	313.00	$1,816.18	25	0.71	$0.47
Process	Process Boiler	EF .90	577.31	$2,770.44	25	1.33	$0.39
Process	Process Boiler	EF .96	668.14	$4,761.05	25	0.91	$0.57
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-11 Energy Efficiency Equipment Data, Electric-Metals, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	365.05	$135.44	20	6.32	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	438.06	$153.03	20	6.71	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	912.62	$170.63	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	967.38	$188.22	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	753.39	$107.13	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	854.11	$114.78	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	1,005.30	$137.74	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1,206.82	$214.26	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1,257.29	$237.21	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1,358.29	$260.17	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	439.46	$158.56	16	-	$0.04
Cooling	Roof top AC	EER 11.2	880.65	$182.96	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	1,150.72	$585.46	16	1.28	$0.05
Cooling	Roof top AC	Ductless Minisplit	1,441.55	$1,921.05	16	0.62	$0.13
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	483.09	$200.72	16	-	$0.04
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	768.98	$25.09	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	1,020.67	$740.17	16	0.71	$0.07
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	1,119.55	$1,097.71	16	0.66	$0.10
Cooling	Air Source Heat Pump	Ductless Minisplit	1,416.17	$1,850.43	16	0.72	$0.13
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	306.32	$465.12	16	1.34	$0.15
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	558.90	$954.72	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1,367.14	$1,300.69	16	2.13	$0.09
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	80.53	$2,037.46	16	-	$2.50
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	125.22	$254.68	16	1.00	$0.20
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	162.08	$7,513.14	16	0.00	$4.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	176.29	$11,142.37	16	0.00	$6.26
Heating	Air Source Heat Pump	Ductless Minisplit	215.42	$18,782.86	16	0.00	$8.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	283.25	$4,178.27	16	0.04	$1.46
Heating	Geothermal Heat Pump	EER 18, COP 3.8	652.21	$8,576.44	16	0.04	$1.30
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,194.59	$11,684.40	16	0.06	$0.97
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	151.76	$5.73	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	233.15	$7.88	3	-	$0.01
Interior Lighting	Screw-in	CFL	436.48	$2.87	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	475.99	$47.38	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	545.21	$13.25	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	31.01	$14.74	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	31.57	($0.98)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	33.59	$0.50	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	37.05	$13.57	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	39.31	$1.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	40.30	$1.07	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	60.24	$3.16	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	232.90	$630.35	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	242.37	($0.09)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	336.23	$92.27	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	389.76	$70.11	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	726.63	$173.43	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.24	$0.01	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.36	$0.01	3	-	$0.01
Exterior Lighting	Screw-in	CFL	0.68	$0.00	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.73	$0.18	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.85	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	103.73	$132.23	15	0.14	$0.13
Exterior Lighting	HID	T8	106.57	($3.31)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	113.40	$1.68	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	132.71	$3.38	15	1.00	$0.00
Exterior Lighting	HID	T5	136.02	$3.62	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	200.06	$34.07	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.02	$0.05	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.02	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.03	$0.01	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.03	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.06	$0.01	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	6.33	$5.23	10	0.48	$0.11
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	10.83	$10.35	10	0.42	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	9.25	$5.61	10	0.66	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	12.79	$13.44	10	0.38	$0.14
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	14.07	$14.79	10	0.38	$0.14
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	14.93	$15.68	10	0.38	$0.14
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-12 Energy Efficiency Equipment Data, Natural Gas-Metals, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	20.79	$488.98	20	0.30	$2.08
Heating	Furnace	EF .82	30.43	$1,322.92	20	0.16	$3.84
Heating	Furnace	EF .90	64.58	$1,155.39	20	0.39	$1.58
Heating	Furnace	EF .96	86.67	$1,677.90	20	0.36	$1.71
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	273.76	$381.20	25	1.00	$0.11
Heating	Boiler	EF .83	461.77	$2,249.06	25	0.84	$0.39
Heating	Boiler	EF .90	851.70	$3,430.76	25	1.58	$0.32
Heating	Boiler	EF .96	985.62	$5,895.83	25	1.08	$0.48
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	21.77	$10.56	15	-	$0.05
Heating	Other Heating	AFUE .76	26.89	$15.09	15	1.00	$0.06
Heating	Other Heating	AFUE .77	32.02	$23.54	15	3.31	$0.08
Heating	Other Heating	AFUE .80	46.10	$47.99	15	3.19	$0.11
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	20.28	$28.24	25	1.00	$0.11
Process	Process Boiler	EF .83	34.21	$166.60	25	0.84	$0.39
Process	Process Boiler	EF .90	63.09	$254.14	25	1.58	$0.32
Process	Process Boiler	EF .96	73.01	$436.74	25	1.08	$0.48
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-13 Energy Efficiency Equipment Data, Electric-Metals, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	326.49	$192.22	20	3.98	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	391.78	$217.19	20	4.23	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	816.22	$242.17	20	7.90	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	865.19	$267.14	20	7.59	$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	704.74	$165.21	20	10.00	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	798.95	$177.01	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	940.37	$212.41	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	1,128.38	$330.41	20	8.00	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	1,175.61	$365.81	20	7.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	1,270.09	$401.21	20	7.42	$0.03
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	422.73	$176.32	16	-	$0.04
Cooling	Roof top AC	EER 11.2	847.35	$203.45	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	1,107.13	$651.03	16	1.11	$0.06
Cooling	Roof top AC	Ductless Minisplit	1,386.95	$2,136.18	16	0.53	$0.15
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	417.61	$194.27	16	-	$0.05
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	664.64	$24.28	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	882.31	$716.39	16	0.64	$0.08
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	967.78	$1,062.44	16	0.59	$0.11
Cooling	Air Source Heat Pump	Ductless Minisplit	1,224.31	$1,790.96	16	0.64	$0.14
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	269.45	$458.06	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	491.62	$940.22	16	1.06	$0.19
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	1,202.59	$1,280.94	16	1.90	$0.11
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	72.33	$982.20	16	-	$1.34
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	112.48	$122.77	16	1.00	$0.11
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	145.59	$3,621.84	16	0.01	$2.46
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	158.36	$5,371.38	16	0.00	$3.36
Heating	Air Source Heat Pump	Ductless Minisplit	193.51	$9,054.61	16	0.00	$4.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	263.58	$2,065.58	16	0.07	$0.78
Heating	Geothermal Heat Pump	EER 18, COP 3.8	606.92	$4,239.88	16	0.08	$0.69
Heating	Geothermal Heat Pump	EER 30, COP 5.0	1,144.26	$5,776.34	16	0.11	$0.50
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	151.76	$5.73	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	233.15	$7.88	3	-	$0.01
Interior Lighting	Screw-in	CFL	436.48	$2.87	6	> 10	$0.00
Interior Lighting	Screw-in	LED (2010)	475.99	$47.38	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	545.21	$13.25	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	31.01	$14.74	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	31.57	($0.98)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	33.59	$0.50	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	37.05	$13.57	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	39.31	$1.00	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	40.30	$1.07	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	60.24	$3.16	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	232.90	$630.35	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	242.37	($0.09)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	336.23	$92.27	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	389.76	$70.11	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	726.63	$173.43	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.24	$0.01	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.36	$0.01	3	-	$0.01
Exterior Lighting	Screw-in	CFL	0.68	$0.00	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	0.73	$0.18	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	0.85	$0.05	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	103.73	$132.23	15	0.14	$0.13
Exterior Lighting	HID	T8	106.57	($3.31)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	113.40	$1.68	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	132.71	$3.38	15	1.00	$0.00
Exterior Lighting	HID	T5	136.02	$3.62	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	200.06	$34.07	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.02	$0.05	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.02	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.03	$0.01	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.03	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.06	$0.01	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	6.33	$5.49	10	0.46	$0.12
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	10.83	$10.86	10	0.40	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	9.25	$5.89	10	0.63	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	12.79	$14.11	10	0.36	$0.15
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	14.07	$15.52	10	0.36	$0.15
Motors	Other Motors	Standard	-	-	10	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Motors	Other Motors	High Efficiency	14.93	$16.46	10	0.36	$0.15
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-14 Energy Efficiency Equipment Data, Natural Gas-Metals, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	19.20	$208.97	20	0.64	$0.96
Heating	Furnace	EF .82	28.10	$565.37	20	0.35	$1.78
Heating	Furnace	EF .90	59.72	$493.77	20	0.84	$0.73
Heating	Furnace	EF .96	79.98	$717.08	20	0.78	$0.79
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	249.66	$414.15	25	1.00	$0.13
Heating	Boiler	EF .83	421.12	$2,443.51	25	0.71	$0.47
Heating	Boiler	EF .90	776.73	$3,727.39	25	1.33	$0.39
Heating	Boiler	EF .96	898.93	$6,405.59	25	0.91	$0.57
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	19.70	$8.55	15	-	$0.04
Heating	Other Heating	AFUE .76	24.33	$12.22	15	1.00	$0.05
Heating	Other Heating	AFUE .77	28.97	$19.06	15	3.70	$0.07
Heating	Other Heating	AFUE .80	41.72	$38.85	15	3.56	$0.10
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	18.56	$30.80	25	1.00	$0.13
Process	Process Boiler	EF .83	31.31	$181.70	25	0.71	$0.47
Process	Process Boiler	EF .90	57.76	$277.17	25	1.33	$0.39
Process	Process Boiler	EF .96	66.84	$476.32	25	0.91	$0.57
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-15 Energy Efficiency Equipment Data, Electric-Machinery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	1,416.14	$525.40	20	6.32	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,699.36	$593.66	20	6.71	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	3,540.32	$661.92	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	3,752.73	$730.18	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	2,922.62	$415.58	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	3,313.33	$445.26	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,899.84	$534.32	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	4,681.59	$831.16	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	4,877.41	$920.21	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	5,269.19	$1,009.26	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	1,704.78	$615.11	16	-	$0.04
Cooling	Roof top AC	EER 11.2	3,416.30	$709.75	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	4,463.96	$2,271.18	16	1.28	$0.05
Cooling	Roof top AC	Ductless Minisplit	5,592.18	$7,452.32	16	0.62	$0.13
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	1,874.04	$778.67	16	-	$0.04
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	2,983.11	$97.33	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	3,959.48	$2,871.35	16	0.71	$0.07
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	4,343.05	$4,258.36	16	0.66	$0.10
Cooling	Air Source Heat Pump	Ductless Minisplit	5,493.75	$7,178.37	16	0.72	$0.13
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	1,188.30	$1,804.33	16	1.34	$0.15
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	2,168.12	$3,703.63	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	5,303.55	$5,045.77	16	2.13	$0.09
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	312.38	$7,903.91	16	-	$2.50
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	485.75	$987.99	16	1.00	$0.20
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	628.76	$29,145.68	16	0.00	$4.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	683.88	$43,224.53	16	0.00	$6.26
Heating	Air Source Heat Pump	Ductless Minisplit	835.68	$72,864.20	16	0.00	$8.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	1,098.79	$16,208.71	16	0.04	$1.46
Heating	Geothermal Heat Pump	EER 18, COP 3.8	2,530.11	$33,270.52	16	0.04	$1.30
Heating	Geothermal Heat Pump	EER 30, COP 5.0	4,634.15	$45,327.22	16	0.06	$0.97
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	362.70	$13.69	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	557.23	$18.83	3	-	$0.01
Interior Lighting	Screw-in	CFL	1,043.19	$6.86	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	1,137.62	$113.24	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	1,303.07	$31.67	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	74.11	$35.23	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	75.45	($2.35)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	80.29	$1.19	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	88.54	$32.44	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	93.96	$2.39	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	96.31	$2.57	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	143.96	$7.55	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	556.64	$1,506.55	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	579.26	($0.22)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	803.59	$220.53	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	931.54	$167.57	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,736.65	$414.49	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.56	$0.02	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.86	$0.03	3	-	$0.01
Exterior Lighting	Screw-in	CFL	1.62	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.75	$0.44	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	2.02	$0.12	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	247.91	$316.03	15	0.14	$0.13
Exterior Lighting	HID	T8	254.70	($7.92)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	271.02	$4.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	317.17	$8.08	15	1.00	$0.00
Exterior Lighting	HID	T5	325.09	$8.66	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	478.14	$81.44	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.04	$0.12	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.04	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.06	$0.02	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.07	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.13	$0.03	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	10.76	$8.90	10	0.48	$0.11
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	13.28	$12.68	10	0.42	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	9.17	$5.56	10	0.66	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	4.50	$4.73	10	0.38	$0.14
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	17.85	$18.76	10	0.38	$0.14
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	0.38	$0.39	10	0.38	$0.14
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-16 Energy Efficiency Equipment Data, Natural Gas-Machinery, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	52.47	$1,233.81	20	0.30	$2.08
Heating	Furnace	EF .82	76.78	$3,338.04	20	0.16	$3.84
Heating	Furnace	EF .90	162.94	$2,915.33	20	0.39	$1.58
Heating	Furnace	EF .96	218.69	$4,233.75	20	0.36	$1.71
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	690.77	$961.85	25	1.00	$0.11
Heating	Boiler	EF .83	1,165.15	$5,674.92	25	0.84	$0.39
Heating	Boiler	EF .90	2,149.05	$8,656.65	25	1.58	$0.32
Heating	Boiler	EF .96	2,486.96	$14,876.62	25	1.08	$0.48
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	54.93	$26.66	15	-	$0.05
Heating	Other Heating	AFUE .76	67.86	$38.08	15	1.00	$0.06
Heating	Other Heating	AFUE .77	80.79	$59.41	15	3.31	$0.08
Heating	Other Heating	AFUE .80	116.33	$121.10	15	3.19	$0.11
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	23.04	$32.09	25	1.00	$0.11
Process	Process Boiler	EF .83	38.87	$189.32	25	0.84	$0.39
Process	Process Boiler	EF .90	71.69	$288.79	25	1.58	$0.32
Process	Process Boiler	EF .96	82.97	$496.28	25	1.08	$0.48
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-17 Energy Efficiency Equipment Data, Electric-Machinery, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	1,266.54	$745.68	20	3.98	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,519.84	$842.56	20	4.23	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	3,166.37	$939.44	20	7.90	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	3,356.33	$1,036.31	20	7.59	$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	2,733.91	$640.88	20	10.00	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	3,099.35	$686.66	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,647.98	$823.99	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	4,377.33	$1,281.76	20	8.00	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	4,560.52	$1,419.09	20	7.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	4,927.03	$1,556.42	20	7.42	$0.03
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	1,639.88	$683.99	16	-	$0.04
Cooling	Roof top AC	EER 11.2	3,287.11	$789.22	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	4,294.87	$2,525.52	16	1.11	$0.06
Cooling	Roof top AC	Ductless Minisplit	5,380.37	$8,286.86	16	0.53	$0.15
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	1,620.05	$753.65	16	-	$0.05
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	2,578.33	$94.21	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	3,422.74	$2,779.07	16	0.64	$0.08
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	3,754.28	$4,121.50	16	0.59	$0.11
Cooling	Air Source Heat Pump	Ductless Minisplit	4,749.46	$6,947.67	16	0.64	$0.14
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	1,045.26	$1,776.93	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	1,907.15	$3,647.39	16	1.06	$0.19
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	4,665.18	$4,969.14	16	1.90	$0.11
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	280.61	$3,810.22	16	-	$1.34
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	436.34	$476.28	16	1.00	$0.11
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	564.80	$14,050.19	16	0.01	$2.46
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	614.32	$20,837.15	16	0.00	$3.36
Heating	Air Source Heat Pump	Ductless Minisplit	750.67	$35,125.49	16	0.00	$4.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	1,022.50	$8,012.99	16	0.07	$0.78
Heating	Geothermal Heat Pump	EER 18, COP 3.8	2,354.44	$16,447.73	16	0.08	$0.69
Heating	Geothermal Heat Pump	EER 30, COP 5.0	4,438.94	$22,408.11	16	0.11	$0.50
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	362.70	$13.69	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	557.23	$18.83	3	-	$0.01
Interior Lighting	Screw-in	CFL	1,043.19	$6.86	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	1,137.62	$113.24	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	1,303.07	$31.67	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	74.11	$35.23	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	75.45	($2.35)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	80.29	$1.19	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	88.54	$32.44	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	93.96	$2.39	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	96.31	$2.57	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	143.96	$7.55	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	556.64	$1,506.55	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	579.26	($0.22)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	803.59	$220.53	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	931.54	$167.57	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,736.65	$414.49	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.56	$0.02	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.86	$0.03	3	-	$0.01
Exterior Lighting	Screw-in	CFL	1.62	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.75	$0.44	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	2.02	$0.12	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	247.91	$316.03	15	0.14	$0.13
Exterior Lighting	HID	T8	254.70	($7.92)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	271.02	$4.01	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	317.17	$8.08	15	1.00	$0.00
Exterior Lighting	HID	T5	325.09	$8.66	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	478.14	$81.44	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.04	$0.12	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.04	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.06	$0.02	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.07	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.13	$0.03	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	10.76	$9.35	10	0.46	$0.12
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	13.28	$13.32	10	0.40	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	9.17	$5.84	10	0.63	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	4.50	$4.97	10	0.36	$0.15
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	17.85	$19.69	10	0.36	$0.15
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	0.38	$0.41	10	0.36	$0.15
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-18 Energy Efficiency Equipment Data, Natural Gas-Machinery, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	48.44	$527.29	20	0.64	$0.96
Heating	Furnace	EF .82	70.89	$1,426.57	20	0.35	$1.78
Heating	Furnace	EF .90	150.69	$1,245.91	20	0.84	$0.73
Heating	Furnace	EF .96	201.81	$1,809.36	20	0.78	$0.79
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	629.96	$1,045.01	25	1.00	$0.13
Heating	Boiler	EF .83	1,062.58	$6,165.58	25	0.71	$0.47
Heating	Boiler	EF .90	1,959.87	$9,405.12	25	1.33	$0.39
Heating	Boiler	EF .96	2,268.23	$16,162.87	25	0.91	$0.57
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	49.71	$21.58	15	-	$0.04
Heating	Other Heating	AFUE .76	61.40	$30.82	15	1.00	$0.05
Heating	Other Heating	AFUE .77	73.10	$48.08	15	3.70	$0.07
Heating	Other Heating	AFUE .80	105.26	$98.02	15	3.56	$0.10
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	21.10	$34.99	25	1.00	$0.13
Process	Process Boiler	EF .83	35.58	$206.47	25	0.71	$0.47
Process	Process Boiler	EF .90	65.63	$314.95	25	1.33	$0.39
Process	Process Boiler	EF .96	75.96	$541.25	25	0.91	$0.57
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-19 Energy Efficiency Equipment Data, Electric-Other Industrial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	1,199.98	$445.20	20	6.32	$0.03
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,439.97	$503.04	20	6.71	$0.03
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,999.93	$560.88	20	> 10	$0.02
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	3,179.92	$618.72	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	2,476.51	$352.15	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	2,807.59	$377.30	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,304.57	$452.76	20	> 10	$0.01
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	3,967.00	$704.29	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	4,132.93	$779.75	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	4,464.91	$855.21	20	> 10	$0.02
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	1,444.57	$521.22	16	-	$0.04
Cooling	Roof top AC	EER 11.2	2,894.84	$601.41	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	3,782.59	$1,924.51	16	1.28	$0.05
Cooling	Roof top AC	Ductless Minisplit	4,738.60	$6,314.81	16	0.62	$0.13
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	1,587.99	$659.82	16	-	$0.04
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	2,527.77	$82.48	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	3,355.11	$2,433.07	16	0.71	$0.07
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	3,680.13	$3,608.37	16	0.66	$0.10
Cooling	Air Source Heat Pump	Ductless Minisplit	4,655.19	$6,082.68	16	0.72	$0.13
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	1,006.92	$1,528.92	16	1.34	$0.15
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	1,837.18	$3,138.32	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	4,494.03	$4,275.59	16	2.13	$0.09
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	264.70	$6,697.47	16	-	$2.50
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	411.60	$837.18	16	1.00	$0.20
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	532.78	$24,696.93	16	0.00	$4.59
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	579.50	$36,626.81	16	0.00	$6.26
Heating	Air Source Heat Pump	Ductless Minisplit	708.12	$61,742.33	16	0.00	$8.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	931.07	$13,734.64	16	0.04	$1.46
Heating	Geothermal Heat Pump	EER 18, COP 3.8	2,143.92	$28,192.16	16	0.04	$1.30
Heating	Geothermal Heat Pump	EER 30, COP 5.0	3,926.80	$38,408.54	16	0.06	$0.97
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	330.78	$12.49	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	508.19	$17.18	3	-	$0.01
Interior Lighting	Screw-in	CFL	951.39	$6.25	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	1,037.50	$103.28	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	1,188.40	$28.88	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	67.59	$32.13	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	68.81	($2.14)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	73.22	$1.08	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	80.75	$29.59	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	85.69	$2.18	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	87.83	$2.34	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	131.29	$6.89	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	507.66	$1,373.97	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	528.28	($0.20)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	732.87	$201.12	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	849.56	$152.83	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,583.83	$378.01	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.51	$0.02	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.79	$0.03	3	-	$0.01
Exterior Lighting	Screw-in	CFL	1.48	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.60	$0.40	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	1.84	$0.11	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	226.09	$288.22	15	0.14	$0.13
Exterior Lighting	HID	T8	232.29	($7.22)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	247.17	$3.66	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	289.26	$7.37	15	1.00	$0.00
Exterior Lighting	HID	T5	296.48	$7.90	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	436.06	$74.27	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.04	$0.11	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.04	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.06	$0.02	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.07	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.12	$0.03	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	6.48	$5.36	10	0.48	$0.11
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	8.00	$7.64	10	0.42	$0.13
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	5.53	$3.35	10	0.66	$0.08
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	2.71	$2.85	10	0.38	$0.14
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	10.75	$11.30	10	0.38	$0.14
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	0.23	$0.24	10	0.38	$0.14
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-20 Energy Efficiency Equipment Data, Natural Gas-Other Industrial, Existing Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	65.04	$1,529.44	20	0.30	$2.08
Heating	Furnace	EF .82	95.18	$4,137.84	20	0.16	$3.84
Heating	Furnace	EF .90	201.98	$3,613.84	20	0.39	$1.58
Heating	Furnace	EF .96	271.09	$5,248.15	20	0.36	$1.71
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	856.27	$1,192.31	25	1.00	$0.11
Heating	Boiler	EF .83	1,444.32	$7,034.62	25	0.84	$0.39
Heating	Boiler	EF .90	2,663.96	$10,730.78	25	1.58	$0.32
Heating	Boiler	EF .96	3,082.83	$18,441.05	25	1.08	$0.48
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	68.10	$33.04	15	-	$0.05
Heating	Other Heating	AFUE .76	84.12	$47.21	15	1.00	$0.06
Heating	Other Heating	AFUE .77	100.14	$73.64	15	3.31	$0.08
Heating	Other Heating	AFUE .80	144.21	$150.12	15	3.19	$0.11
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	12.51	$17.43	25	1.00	$0.11
Process	Process Boiler	EF .83	21.11	$102.81	25	0.84	$0.39
Process	Process Boiler	EF .90	38.93	$156.83	25	1.58	$0.32
Process	Process Boiler	EF .96	45.06	$269.52	25	1.08	$0.48
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-21 Energy Efficiency Equipment Data, Electrics-Other Industrial, New Vintage

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/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	1,073.22	$631.86	20	3.98	$0.05
Cooling	Air-Cooled Chiller	1.26 kw/ton, COP 2.8	1,287.85	$713.95	20	4.23	$0.05
Cooling	Air-Cooled Chiller	1.0 kw/ton, COP 3.5	2,683.06	$796.04	20	7.90	$0.03
Cooling	Air-Cooled Chiller	0.97 kw/ton, COP 3.6	2,844.02	$878.13	20	7.59	$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	2,316.61	$543.06	20	10.00	$0.02
Cooling	Water-Cooled Chiller	0.58 kw/ton, COP 6.1	2,626.27	$581.85	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.55 kw/Ton, COP 6.4	3,091.16	$698.21	20	> 10	$0.02
Cooling	Water-Cooled Chiller	0.51 kw/ton, COP 6.9	3,709.18	$1,086.11	20	8.00	$0.03
Cooling	Water-Cooled Chiller	0.50 kw/Ton, COP 7.0	3,864.41	$1,202.48	20	7.53	$0.03
Cooling	Water-Cooled Chiller	0.48 kw/ton, COP 7.3	4,174.98	$1,318.85	20	7.42	$0.03
Cooling	Roof top AC	EER 9.2	-	-	16	-	-
Cooling	Roof top AC	EER 10.1	1,389.57	$579.59	16	-	$0.04
Cooling	Roof top AC	EER 11.2	2,785.37	$668.76	16	1.00	$0.02
Cooling	Roof top AC	EER 12.0	3,639.31	$2,140.03	16	1.11	$0.06
Cooling	Roof top AC	Ductless Minisplit	4,559.12	$7,021.96	16	0.53	$0.15
Cooling	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Cooling	Air Source Heat Pump	EER 10.3, COP 3.2	1,372.77	$638.61	16	-	$0.05
Cooling	Air Source Heat Pump	EER 11.0, COP 3.3	2,184.78	$79.83	16	1.00	$0.00
Cooling	Air Source Heat Pump	EER 11.7, COP 3.4	2,900.30	$2,354.88	16	0.64	$0.08
Cooling	Air Source Heat Pump	EER 12.0, COP 3.4	3,181.24	$3,492.40	16	0.59	$0.11
Cooling	Air Source Heat Pump	Ductless Minisplit	4,024.51	$5,887.19	16	0.64	$0.14
Cooling	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Cooling	Geothermal Heat Pump	EER 16, COP 3.5	885.72	$1,505.71	16	1.19	$0.17
Cooling	Geothermal Heat Pump	EER 18, COP 3.8	1,616.05	$3,090.66	16	1.06	$0.19
Cooling	Geothermal Heat Pump	EER 30, COP 5.0	3,953.09	$4,210.66	16	1.90	$0.11
Cooling	Other Cooling	EER 9.8	-	-	14	1.00	-
Cooling	Other Cooling	EER 10.2	-	-	14	-	-
Cooling	Other Cooling	EER 10.8	-	-	14	-	-
Cooling	Other Cooling	EER 11	-	-	14	-	-
Cooling	Other Cooling	EER 11.5	-	-	14	-	-
Heating	Air Source Heat Pump	EER 9.3, COP 3.1	-	-	16	-	-
Heating	Air Source Heat Pump	EER 10.3, COP 3.2	237.77	$3,228.64	16	-	$1.34
Heating	Air Source Heat Pump	EER 11.0, COP 3.3	369.74	$403.58	16	1.00	$0.11
Heating	Air Source Heat Pump	EER 11.7, COP 3.4	478.59	$11,905.60	16	0.01	$2.46
Heating	Air Source Heat Pump	EER 12.0, COP 3.4	520.55	$17,656.60	16	0.00	$3.36
Heating	Air Source Heat Pump	Ductless Minisplit	636.09	$29,763.99	16	0.00	$4.63
Heating	Geothermal Heat Pump	EER 14.1, COP 3.3	-	-	16	1.00	-
Heating	Geothermal Heat Pump	EER 16, COP 3.5	866.43	$6,789.90	16	0.07	$0.78
Heating	Geothermal Heat Pump	EER 18, COP 3.8	1,995.06	$13,937.17	16	0.08	$0.69
Heating	Geothermal Heat Pump	EER 30, COP 5.0	3,761.38	$18,987.78	16	0.11	$0.50
Heating	Electric Resistance	Standard	-	-	20	1.00	-
Heating	Electric Furnace	Standard	-	-	20	1.00	-
Ventilation	Ventilation	Constant Volume	-	-	10	1.00	-
Ventilation	Ventilation	Variable Air Volume	-	-	10	-	-
Interior Lighting	Screw-in	Incandescent	-	-	2	1.00	-
Interior Lighting	Screw-in	90W Halogen PAR-38	330.78	$12.49	3	-	$0.01
Interior Lighting	Screw-in	70W HIR PAR-38	508.19	$17.18	3	-	$0.01
Interior Lighting	Screw-in	CFL	951.39	$6.25	6	> 10	$0.00

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Interior Lighting	Screw-in	LED (2010)	1,037.50	$103.28	20	3.56	$0.01
Interior Lighting	Screw-in	LED (2020)	1,188.40	$28.88	20	-	$0.00
Interior Lighting	High-Bay Fixtures	Metal Halides	-	-	3	1.00	-
Interior Lighting	High-Bay Fixtures	LED (2010)	67.59	$32.13	15	0.10	$0.05
Interior Lighting	High-Bay Fixtures	T8	68.81	($2.14)	10	1.00	($0.00)
Interior Lighting	High-Bay Fixtures	High Pressure Sodium	73.22	$1.08	6	1.00	$0.00
Interior Lighting	High-Bay Fixtures	Induction	80.75	$29.59	15	0.45	$0.04
Interior Lighting	High-Bay Fixtures	Light Emitting Plasma	85.69	$2.18	15	1.00	$0.00
Interior Lighting	High-Bay Fixtures	T5	87.83	$2.34	10	1.00	$0.00
Interior Lighting	High-Bay Fixtures	LED (2020)	131.29	$6.89	15	-	$0.01
Interior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Interior Lighting	Linear Fluorescent	LED (2010)	507.66	$1,373.97	15	1.00	$0.28
Interior Lighting	Linear Fluorescent	T8	528.28	($0.20)	10	1.00	($0.00)
Interior Lighting	Linear Fluorescent	Super T8	732.87	$201.12	10	1.00	$0.04
Interior Lighting	Linear Fluorescent	T5	849.56	$152.83	10	1.00	$0.02
Interior Lighting	Linear Fluorescent	LED (2020)	1,583.83	$378.01	15	-	$0.02
Exterior Lighting	Screw-in	Incandescent	-	-	2	-	-
Exterior Lighting	Screw-in	90W Halogen PAR-38	0.51	$0.02	3	1.00	$0.01
Exterior Lighting	Screw-in	70W HIR PAR-38	0.79	$0.03	3	-	$0.01
Exterior Lighting	Screw-in	CFL	1.48	$0.01	6	1.00	$0.00
Exterior Lighting	Screw-in	LED (2010)	1.60	$0.40	20	1.33	$0.02
Exterior Lighting	Screw-in	LED (2020)	1.84	$0.11	20	-	$0.01
Exterior Lighting	HID	Metal Halides	-	-	3	1.00	-
Exterior Lighting	HID	LED (2010)	226.09	$288.22	15	0.14	$0.13
Exterior Lighting	HID	T8	232.29	($7.22)	10	1.00	($0.00)
Exterior Lighting	HID	High Pressure Sodium	247.17	$3.66	6	1.00	$0.00
Exterior Lighting	HID	Light Emitting Plasma	289.26	$7.37	15	1.00	$0.00
Exterior Lighting	HID	T5	296.48	$7.90	10	1.00	$0.00
Exterior Lighting	HID	LED (2020)	436.06	$74.27	15	-	$0.02
Exterior Lighting	Linear Fluorescent	T12	-	-	10	-	-
Exterior Lighting	Linear Fluorescent	LED (2010)	0.04	$0.11	15	1.00	$0.28
Exterior Lighting	Linear Fluorescent	T8	0.04	($0.00)	10	1.00	($0.00)
Exterior Lighting	Linear Fluorescent	Super T8	0.06	$0.02	10	1.00	$0.04
Exterior Lighting	Linear Fluorescent	T5	0.07	$0.01	10	1.00	$0.02
Exterior Lighting	Linear Fluorescent	LED (2020)	0.12	$0.03	15	-	$0.02
Motors	Pumps	Standard	-	-	10	1.00	-
Motors	Pumps	High Efficiency	6.48	$5.90	10	0.44	$0.12
Motors	Fans & Blowers	Standard	-	-	10	1.00	-
Motors	Fans & Blowers	High Efficiency	8.00	$8.40	10	0.38	$0.14
Motors	Compressed Air	Standard	-	-	10	1.00	-
Motors	Compressed Air	High Efficiency	5.53	$3.68	10	0.60	$0.09
Motors	Matl Handling	Standard	-	-	10	1.00	-
Motors	Matl Handling	High Efficiency	2.71	$3.13	10	0.35	$0.15
Motors	Matl Processing	Standard	-	-	10	1.00	-
Motors	Matl Processing	High Efficiency	10.75	$12.43	10	0.35	$0.15
Motors	Other Motors	Standard	-	-	10	1.00	-
Motors	Other Motors	High Efficiency	0.23	$0.26	10	0.35	$0.15
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Cooling and Refrig	Standard	-	-	15	1.00	-
Process	Electro-Chemical Processes	Standard	-	-	15	1.00	-

End Use	Technology	Efficiency Definition	Savings (kWh/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/kWh)
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-22 Energy Efficiency Equipment Data, Natural Gas-Other Industrial, New Vintage

End Use	Technology	Efficiency Definition	Savings (therms/ empl/yr)	Incremental Cost ($/empl)	Lifetime (Years)	BC Ratio (2013)	Levelized Cost of Energy ($/therm)
Heating	Furnace	EF .76	-	-	20	1.00	-
Heating	Furnace	EF .80	60.05	$653.63	20	0.64	$0.96
Heating	Furnace	EF .82	87.88	$1,768.37	20	0.35	$1.78
Heating	Furnace	EF .90	186.79	$1,544.43	20	0.84	$0.73
Heating	Furnace	EF .96	250.17	$2,242.88	20	0.78	$0.79
Heating	Boiler	EF .76	-	-	25	-	-
Heating	Boiler	EF .80	780.90	$1,295.40	25	1.00	$0.13
Heating	Boiler	EF .83	1,317.18	$7,642.85	25	0.71	$0.47
Heating	Boiler	EF .90	2,429.46	$11,658.58	25	1.33	$0.39
Heating	Boiler	EF .96	2,811.69	$20,035.49	25	0.91	$0.57
Heating	Other Heating	AFUE .74	-	-	15	-	-
Heating	Other Heating	AFUE .75	61.62	$26.75	15	-	$0.04
Heating	Other Heating	AFUE .76	76.11	$38.21	15	1.00	$0.05
Heating	Other Heating	AFUE .77	90.61	$59.61	15	3.70	$0.07
Heating	Other Heating	AFUE .80	130.48	$121.50	15	3.56	$0.10
Process	Process Heating	Standard	-	-	15	1.00	-
Process	Process Boiler	EF .76	-	-	25	-	-
Process	Process Boiler	EF .80	11.46	$19.00	25	1.00	$0.13
Process	Process Boiler	EF .83	19.32	$112.13	25	0.71	$0.47
Process	Process Boiler	EF .90	35.64	$171.04	25	1.33	$0.39
Process	Process Boiler	EF .96	41.25	$293.94	25	0.91	$0.57
Process	Process Cooling	Standard	-	-	15	1.00	-
Process	Other Process	Standard	-	-	15	1.00	-
Miscellaneous	Miscellaneous	Standard	-	-	5	1.00	-

Table D-23 Energy Efficiency Non-Equipment Data- Electric Food Products, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.68	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.19	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366.8	0.69	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562.6	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.77	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969.2	8.22	0.02
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.41	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.37	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.50	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.89	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138.1	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.75	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969.2	8.32	0.02
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	30%	75%	15	27,671.0	$/bldg	125,726.8	0.41	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150.2	3.54	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	5.95	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969.2	7.55	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755.3	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.16	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.11	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.22	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.40	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736.3	2.68	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536.2	1.74	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.60	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	0.95	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.22	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.72	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.03	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.14	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.08	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.16	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.83	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.76	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.27	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.60	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.94	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.31	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.74	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-24 Energy Efficiency Non-Equipment Data-Natural Gas Food Products, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.69	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.68	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.84	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.38	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.94	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.81	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	6.22	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.15	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.10	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.20	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.37	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.63	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.88	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	1.32	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.31	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.06	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.13	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.36	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.84	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.90	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.30	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.55	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.31	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.61	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.49	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	5.88	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	8.64	0.01

Table D-25 Energy Efficiency Non-Equipment Data-Electric Food Products, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.28	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.40	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.44	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.94	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.79	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.87	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.81	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.23	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.19	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	0.97	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.20	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.57	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.70	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.52	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.87	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-26 Energy Efficiency Non-Equipment Data-Natural Gas Food Products, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.26	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.77	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.88	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.72	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.28	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.20	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.19	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.62	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.72	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.55	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.89	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.77	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.53	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-27 Energy Efficiency Non-Equipment Data-Electric Petroleum, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
uuInsulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.68	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.19	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.69	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.77	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.22	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.37	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.50	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.89	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.75	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.32	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.54	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	5.95	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	7.55	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.16	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.11	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.22	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.40	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.74	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.60	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	0.95	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.22	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.72	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.03	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.14	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.08	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.16	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.83	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.76	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.27	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.60	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.94	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.31	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.74	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-28 Energy Efficiency Non-Equipment Data-Natural Gas Petroleum, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.69	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.68	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.84	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.38	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.94	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.81	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	6.22	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.15	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.10	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.20	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.37	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.63	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.88	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	1.32	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.31	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.06	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.13	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.36	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.84	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.90	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.30	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.52	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.31	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.60	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.45	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	5.78	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	8.64	0.01

Table D-29 Energy Efficiency Non-Equipment Data-Electric Petroleum, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.28	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.40	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.44	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.94	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.79	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.87	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.81	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.23	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.19	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	0.97	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.20	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.57	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.70	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.52	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.87	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-30 Energy Efficiency Non-Equipment Data-Natural Gas Petroleum, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.26	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253.6	0.77	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.88	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.72	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.28	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.20	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.19	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.62	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.72	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.55	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.88	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.76	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.51	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-31 Energy Efficiency Non-Equipment Data-Electric Metals, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.68	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.19	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.69	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.77	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.22	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.37	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.50	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.89	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.75	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.32	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.54	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	5.95	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	7.55	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.16	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.11	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.22	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.40	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.74	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.60	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	0.95	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.22	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.72	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.03	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.14	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.08	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.16	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.83	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.76	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.27	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.60	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.94	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.31	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.74	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-32 Energy Efficiency Non-Equipment Data-Natural Gas Metals, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.69	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.68	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.84	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.38	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.94	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.81	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	6.22	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.15	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.10	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.20	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.37	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.63	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.88	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	1.32	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.31	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.06	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.13	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.36	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.84	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.90	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.30	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.50	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.31	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.59	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.42	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	5.71	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	8.64	0.01

Table D-33 Energy Efficiency Non-Equipment Data-Electric Metals, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.28	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.40	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.44	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.94	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.79	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.87	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.81	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.23	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.19	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	0.97	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.20	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.57	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.70	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.52	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.87	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-34 Energy Efficiency Non-Equipment Data-Natural Gas Metals, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.26	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.77	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.88	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.72	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.28	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.20	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.19	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.62	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.72	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.55	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.88	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.75	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.49	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-35 Energy Efficiency Non-Equipment Data-Electric Machinery, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122.3	0.68	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.19	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366.8	0.69	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562.6	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138.1	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.77	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.22	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.37	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.50	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.89	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.75	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.32	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.54	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	5.95	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	7.55	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.16	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.11	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.22	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.40	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.74	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.60	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	0.95	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.22	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.72	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.03	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.14	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.08	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.16	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.83	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.76	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.27	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.60	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.94	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.31	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.74	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-36 Energy Efficiency Non-Equipment Data-Natural Gas Machinery, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.69	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.68	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.84	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.38	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.94	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.81	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	6.22	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.15	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.10	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.20	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.37	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.63	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.88	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	1.32	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.31	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.06	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.13	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.36	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.84	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.90	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.30	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.53	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.31	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.60	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.46	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	5.81	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	8.64	0.01

Table D-37 Energy Efficiency Non-Equipment Data-Electric Machinery, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.28	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.40	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.44	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.94	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.79	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.87	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.81	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.23	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.19	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	0.97	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.20	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.57	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.70	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.52	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.87	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-38 Energy Efficiency Non-Equipment Data-Natural Gas Machinery, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.26	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.77	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.88	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.72	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.28	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.20	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.19	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.62	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.72	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.55	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.88	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.76	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.52	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-39 Energy Efficiency Non-Equipment Data-Electric Other Industrial, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.68	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.19	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.69	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.77	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.22	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.37	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.50	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.89	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.75	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.32	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.41	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.54	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	5.95	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	7.55	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.16	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.11	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.22	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.40	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.74	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.60	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	0.95	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.22	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	0.72	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.03	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.14	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.08	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.08	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.16	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.83	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.76	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.27	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.60	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.94	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.31	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.74	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-40 Energy Efficiency Non-Equipment Data-Natural Gas Other Industrial, Existing Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	209,122	0.69	0.07
Insulation - Ducting	15%	50%	20	0.8	$/sqft	0.8	0.20	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	181,366	0.68	0.06
HVAC - Duct Repair and Sealing	5%	25%	18	54.7	$/bldg	40,562	> 10	0.00
Air-Cooled Chiller - Economizer	0%	49%	10	813.6	$/sqft	1,826,138	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.7	1.84	0.01
Air-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Air-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	836,586	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Air-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.2	$/empl	3.5	0.38	0.05
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	843.3	0.94	0.11
Water-Cooled Chiller - Economizer	0%	49%	10	5,493.8	$/sqft	1,826,138	> 10	0.00
Water-Cooled Chiller - Efficient Mechanical Layout	62%	90%	4	0.1	$/empl	5.5	1.81	0.01
Water-Cooled Chiller - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Water-Cooled Chiller - Chilled Water Reset	5%	75%	10	814.4	$/sqft	723,510	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	125,726	0.43	0.08
Water-Cooled Chiller - Condenser Water Temperature Reset	30%	75%	4	0.0	$/sqft	2.2	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	44,150	3.70	0.02
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	12.6	6.22	0.05
RTU - Maintenance	62%	90%	18	12,397.5	$/bldg	551,969	8.71	0.02
Heat Pump - Maintenance	3%	95%	18	3,826.9	$/bldg	562,755	> 10	0.01
Process Boilers - Hot Water Reset	30%	75%	4	0.2	$/empl	4.5	0.46	0.04
Process Boiler - Combustion Controls (O2 Trim)	0%	49%	25	0.8	$/empl	0.6	0.15	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.8	1.10	0.02
Process Boiler - Condensing Economizer	0%	49%	25	2.0	$/empl	2.0	0.20	0.08
Process Boiler - Pipe Insulation	6%	11%	15	0.3	$/empl	1.2	0.37	0.08
Process Boiler - Steam Trap Maintenance	32%	90%	6	276.0	$/empl	24,736	2.63	0.01
Roofs - High Reflectivity	50%	75%	15	0.1	$/empl	6.7	> 10	0.01
Energy Management System	7%	75%	15	41,951.5	$/bldg	899,536	1.88	0.03
Thermostat - Clock/Programmable	32%	50%	11	1,239.8	$/bldg	4.8	0.00	0.14
Interior Lighting - Occupancy Sensors	6%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	15%	20%	8	0.3	$/empl	11.1	1.32	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	3%	56%	8	0.2	$/empl	1.9	0.31	0.07
Interior Lighting - LED Exit Lighting	50%	86%	16	0.0	$/sqft	0.1	> 10	0.01
Interior Lighting - Daylighting Controls	15%	20%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	6%	75%	5	0.2	$/empl	0.7	0.06	0.16
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	18%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.8	0.13	0.10
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	0%	0%	25	0.4	$/sqft	-	0.00	-
Commissioning - Lighting	0%	0%	5	0.0	$/sqft	-	0.00	-
Retrocommissioning - HVAC	5%	36%	25	0.8	$/sqft	6.2	2.36	0.05
Retrocommissioning - Lighting	32%	37%	5	0.1	$/sqft	3.5	0.84	0.02
Ventilation - CO2 Controlled	1%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	0%	34%	10	0.4	$/sqft	7.4	0.90	0.04
Gas Boiler - Hot Water Reset	30%	75%	3	992.7	$/sqft	1,440,300	> 10	0.00
Gas Boiler - Maintenance	32%	90%	3	2,039.9	$/bldg	346,700	2.30	0.01
Gas Furnace - Maintenance	32%	90%	3	2,007.5	$/bldg	27,100	0.18	0.07
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.53	0.02
Boiler Blowdown Heat Exchanger (Steam)	0%	49%	20	60,000.0	$/sqft	141,150	0.31	0.08
Insulate Steam Lines / Condensate Tank	6%	11%	15	1,302.0	$/empl	9,020	0.60	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.45	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	5.80	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	8.64	0.01

Table D-41 Energy Efficiency Non-Equipment Data-Electric Other Industrial, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.28	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.40	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.44	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.94	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.79	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.87	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.68	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.81	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.23	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.19	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	0.97	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.20	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.57	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.70	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.52	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.87	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.74	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.48	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

Table D-42 Energy Efficiency Non-Equipment Data-Natural Gas Other Industrial, New Vintage

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Insulation - Ceiling	7%	13%	20	56,202.0	$/bldg	251,560	0.70	0.07
Insulation - Ducting	0%	50%	20	0.8	$/sqft	0.6	0.12	0.09
Insulation - Wall Cavity	7%	13%	20	35,615.6	$/bldg	131,989	0.49	0.07
HVAC - Duct Repair and Sealing	25%	25%	18	54.7	$/bldg	9,550	> 10	0.01
Air-Cooled Chiller - Economizer	37%	49%	10	813.6	$/sqft	1,025,553	> 10	0.00
Air-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.6	1.26	0.02
Air-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Air-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	367,516	> 10	0.00
Air-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Air-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.2	$/empl	2.5	0.30	0.06
Air-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Air-Cooled Chiller - VSD on Fans	15%	66%	15	2,063.3	$/bldg	1,253	0.77	0.11
Water-Cooled Chiller - Economizer	37%	49%	10	5,493.8	$/sqft	1,025,553	7.94	0.01
Water-Cooled Chiller - Efficient Mechanical Layout	63%	90%	4	0.1	$/empl	3.9	1.32	0.01
Water-Cooled Chiller - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Water-Cooled Chiller - Chilled Water Reset	25%	75%	10	814.4	$/sqft	311,775	> 10	0.00
Water-Cooled Chiller - Chilled Water Variable-Flow System	30%	75%	15	27,671.0	$/bldg	134,798	0.43	0.07
Water-Cooled Chiller - Condenser Water Temperature Reset	60%	75%	4	0.0	$/sqft	1.4	> 10	0.00
Water-Cooled Chiller - High Efficiency Cooling Tower Fans	15%	41%	15	1,407.1	$/sqft	18,188	1.91	0.05
Water-Cooled Chiller - VSD on Fans	15%	66%	15	1.2	$/bldg	11.0	5.45	0.06
RTU - Maintenance	63%	90%	18	12,397.5	$/bldg	372,336	6.28	0.03
Heat Pump - Maintenance	0%	95%	18	3,826.9	$/bldg	388,659	> 10	0.01
Process Boilers - Hot Water Reset	60%	75%	4	0.2	$/empl	2.3	0.24	0.06
Process Boiler - Combustion Controls (O2 Trim)	37%	49%	25	0.8	$/empl	0.5	0.13	0.08
Process Boiler - Condensate Return Lines	0%	50%	5	0.0	$/empl	1.4	0.88	0.03
Process Boiler - Condensing Economizer	37%	49%	25	2.0	$/empl	1.6	0.17	0.08
Process Boiler - Pipe Insulation	0%	0%	15	0.3	$/empl	0.5	0.17	0.10
Process Boiler - Steam Trap Maintenance	44%	90%	6	276.0	$/empl	24,736	2.72	0.01
Roofs - High Reflectivity	56%	95%	15	0.1	$/empl	5.2	> 10	0.01
Energy Management System	0%	75%	15	41,951.5	$/bldg	531,443	1.01	0.05
Thermostat - Clock/Programmable	86%	86%	11	1,239.8	$/bldg	6.6	0.00	0.14
Interior Lighting - Occupancy Sensors	56%	56%	8	0.1	$/sqft	1.4	0.84	0.04
Interior Lighting - Skylights	42%	42%	8	0.2	$/empl	7.0	1.28	0.02

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Interior Lighting - Time Clocks and Timers	56%	56%	8	0.2	$/empl	1.2	0.20	0.09
Interior Lighting - LED Exit Lighting	86%	86%	16	0.0	$/sqft	0.0	> 10	0.02
Interior Lighting - Daylighting Controls	42%	42%	8	0.1	$/sqft	2.0	1.01	0.04
Interior Screw-in - Task Lighting	0%	75%	5	0.2	$/empl	0.4	0.04	0.19
Interior Fluorescent - Bi-Level Fixture	10%	23%	8	0.5	$/sqft	1.6	0.17	0.12
Interior Fluorescent - Delamp and Install Reflectors	19%	56%	11	0.5	$/sqft	0.6	0.10	0.12
Exterior Lighting - Bi-Level Fixture	10%	30%	8	0.2	$/empl	0.6	0.09	0.12
Exterior Lighting - Daylighting Controls	18%	38%	8	0.0	$/sqft	0.2	0.28	0.07
Exterior Lighting - Photovoltaic Installation	0%	13%	20	43,500.0	$/bldg	0.2	0.00	0.10
Process - Conductivity Controls	20%	100%	5	0.5	$/empl	11.4	0.39	0.04
Process - Controls on Fume Hoods	30%	100%	10	0.1	$/empl	11.4	3.75	0.01
Process - Timers and Controls	40%	100%	5	0.4	$/empl	22.8	1.00	0.02
Refrigeration - Floating Head Pressure	30%	90%	18	0.6	$/empl	11.4	2.06	0.03
Refrigeration - System Controls	40%	56%	18	1.3	$/empl	11.4	0.88	0.05
Refrigeration - System Maintenance	30%	72%	3	0.2	$/empl	11.4	0.46	0.02
Refrigeration - System Optimization	40%	56%	15	0.1	$/empl	11.4	5.90	0.01
Compressed Air - Air Usage Reduction	20%	26%	10	0.1	$/empl	11.4	6.23	0.01
Compressed Air - Compressor Replacement	15%	17%	10	0.1	$/empl	11.4	8.03	0.01
Compressed Air - System Controls	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Compressed Air - System Maintenance	5%	34%	3	0.0	$/empl	11.4	3.36	0.00
Compressed Air - System Optimization and Improvements	25%	36%	10	0.2	$/empl	11.4	2.62	0.02
Pumping System - Controls	23%	31%	10	0.0	$/empl	11.4	> 10	0.00
Pumping System - Maintenance	5%	34%	3	0.0	$/empl	11.4	5.00	0.00
Pumping System - Optimization	22%	30%	10	0.3	$/empl	11.4	1.91	0.02
Pumps - Variable Speed Control	5%	34%	15	0.0	$/empl	11.4	> 10	0.00
Pump Equipment Upgrade	24%	34%	10	0.1	$/empl	11.4	3.92	0.01
Fan Equipment Upgrade	19%	23%	10	0.1	$/empl	11.4	5.84	0.01
Fan System - Controls	21%	27%	10	0.0	$/empl	11.4	> 10	0.00
Fan System - Maintenance	10%	38%	3	0.0	$/empl	11.4	> 10	0.00
Fan System - Optimization	22%	30%	10	0.1	$/empl	11.4	3.97	0.01
Fans - Variable Speed Control	10%	38%	15	0.0	$/empl	11.4	> 10	0.00
Motors - Magnetic Adjustable Speed Drives	5%	15%	20	0.2	$/empl	11.4	7.77	0.01
Motors - Efficient Rewind	15%	35%	10	0.4	$/empl	11.4	1.39	0.03
Motors - Variable Frequency Drive	5%	34%	15	0.0	$/empl	11.4	> 10	0.00

Measure	Base Saturation	Applicability	Life time (Years)	Incremental Cost	Unit	Savings (kBtu/empl)	BC Ratio (2013)	Levelized Cost of Energy ($/kBtu)
Commissioning - HVAC	40%	75%	25	0.4	$/sqft	4.9	4.19	0.04
Commissioning - Lighting	30%	75%	5	0.0	$/sqft	3.4	1.62	0.01
Retrocommissioning - HVAC	0%	0%	25	0.8	$/sqft	-	0.00	-
Retrocommissioning - Lighting	0%	0%	5	0.1	$/sqft	-	0.00	-
Ventilation - CO2 Controlled	6%	8%	15	0.2	$/sqft	7.1	2.44	0.02
Gas Boiler - High Efficiency Hot Water Circulation	5%	34%	10	0.4	$/sqft	5.5	0.72	0.05
Gas Boiler - Hot Water Reset	60%	75%	3	992.7	$/sqft	978,400	> 10	0.00
Gas Boiler - Maintenance	44%	90%	3	2,039.9	$/bldg	228,900	1.55	0.01
Gas Furnace - Maintenance	44%	90%	3	2,007.5	$/bldg	47,400	0.32	0.04
Custom Measures	10%	45%	15	1.3	$/sqft	67.1	4.88	0.02
Boiler Blowdown Heat Exchanger (Steam)	37%	49%	20	60,000.0	$/sqft	141,150	0.35	0.08
Insulate Steam Lines / Condensate Tank	0%	0%	15	1,302.0	$/empl	9,020	0.67	0.06
Direct Fired Make-up Air System	0%	12%	20	5.4	$/empl	100.0	2.76	0.03
Direct Contact Water Heater	0%	12%	20	2.3	$/empl	100.0	6.51	0.02
HVAC - Infrared Heater	7%	13%	20	1.5	$/empl	100.0	9.51	0.01

MARKET ADOPTION FACTORS

To calculate achievable potential, we apply a set of market adoption factors to economic potential. These parameters are described below, followed by a discussion of how they are applied to calculate achievable potential. Finally, we present the three sets of factors at the end of this section.

Maximum Achievable Potential Adoption Rates

These factors are applied to Economic potential to estimate the upper bound of achievable potential: Maximum Achievable Potential. These estimate customer adoption of economic measures when delivered through efficiency programs under ideal market, implementation, and customer preference conditions. Information channels are assumed to be established and efficient for marketing, educating consumers, and coordinating with trade allies and delivery partners. The Maximum Achievable Potential adoption rates are based on the take rates from the program interest surveys. For Maximum Achievable Potential we used the 1-year payback take rate for the customer segment that is most inclined to adopt energy efficiency measures. This reflects what the best practice could achieve in the Ameren Illinois service territory.

The Maximum Achievable Potential adoption rates are applied directly to economic potential to calculate the Maximum Achievable Potential estimates.

Realistic Achievable Potential Adoption Rates

These factors are applied to Maximum Achievable Potential to calculate Realistic Achievable Potential. They reflect expected program participation given current barriers to customer acceptance, non-ideal implementation conditions, and limited program budgets. This represents a lower bound on achievable potential and are also developed using the results of the program interest survey of Ameren Illinois customers. The Realistic Achievable Potential adoption rates are based on the average take rate across all segments at the 3-year payback level.

Like the Maximum Achievable Potential rates, these rates increase over time.

To review the take rates from the program interest surveys, please see Volume 2: Market Research.

Estimates of Achievable Potential

Table E-1 through Table E-28 present the Residential Potential Factors. Maximum Achievable Potential Factors as well as the product of Maximum Achievable Potential factors and Realistic Achievable Potential factors (High x Low) are used to demonstrate how Economic potential is changed to reach Realistic Achievable Potential for residential equipment and non-equipment measures.

Table E-29 through Table E-36 present the same data for the Commercial Sector and Table E-37 through Table E-42 for the Industrial sector.

Table E-1 Single Family Electric Only Customer Equipment Measures—(Maximum Achievable Potential factor)

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cooling	Electric	Central AC	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Cooling	Electric	Room AC	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Cooling	Electric	Air-Source Heat Pump	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Cooling	Electric	Geothermal Heat Pump	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Cooling	Electric	PTHP	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Heating	Electric	Electric Room Heat	55%	56%	56%	57%	57%	58%	58%	59%	59%	60%	60%
Heating	Electric	Furnace	55%	56%	56%	57%	57%	58%	58%	59%	59%	60%	60%
Heating	Electric	Air-Source Heat Pump	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Heating	Electric	Geothermal Heat Pump	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Heating	Electric	PTHP	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Water Heating	Electric	Water Heater <= 55 gal	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Water Heating	Electric	Water Heater > 55 gal	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Interior Lighting	Electric	Screw-in	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Interior Lighting	Electric	Linear Fluorescent	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Interior Lighting	Electric	Specialty	12%	12%	12%	12%	12%	13%	13%	13%	13%	13%	13%
Exterior Lighting	Electric	Screw-in	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Appliances	Electric	Refrigerator	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Appliances	Electric	Second Refrigerator	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Appliances	Electric	Freezer	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Appliances	Electric	Clothes Washer	50%	51%	51%	52%	52%	53%	53%	54%	54%	55%	55%
Appliances	Electric	Clothes Dryer	50%	51%	51%	52%	52%	53%	53%	54%	54%	55%	55%
Appliances	Electric	Dishwasher	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Appliances	Electric	Stove	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Appliances	Electric	Microwave	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Electronics	Electric	Personal Computers	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Electronics	Electric	Monitor	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Electronics	Electric	Laptops	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Electronics	Electric	TVs	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%
Electronics	Electric	Printer/Fax/Copier	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Electronics	Electric	Set-top Boxes/DVR	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Electronics	Electric	Devices and Gadgets	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Miscellaneous	Electric	Air Purifier/Cleaner	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Miscellaneous	Electric	Dehumidifier	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Miscellaneous	Electric	Pool Heater	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Miscellaneous	Electric	Pool Pump	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Miscellaneous	Electric	Hot Tub / Spa	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Miscellaneous	Electric	Well Pump	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Miscellaneous	Electric	Furnace Fan	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Miscellaneous	Electric	Bathroom Exhaust Fan	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Miscellaneous	Electric	Miscellaneous	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%

Table E-2 Single Family Electric Only Customer Non-Equipment Measures—(Maximum Achievable Potential factor)

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Insulation - Ceiling	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Insulation - Ducting	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Insulation - Foundation	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Insulation - Infiltration Control	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Insulation - Radiant Barrier	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Insulation - Wall Cavity	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Insulation - Wall Sheathing	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Ducting - Repair and Sealing	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Windows - High Efficiency/ENERGY STAR	50%	51%	51%	52%	52%	53%	53%	54%	54%	55%	55%
Windows - Install Reflective Film	50%	51%	51%	52%	52%	53%	53%	54%	54%	55%	55%
Doors - Storm and Thermal	50%	51%	51%	52%	52%	53%	53%	54%	54%	55%	55%
Roofs - High Reflectivity	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Attic Fan - Installation	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Attic Fan - Photovoltaic - Installation	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Whole-House Fan - Installation	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Ceiling Fan - Installation	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%
Thermostat - Clock/Programmable	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Home Energy Management System	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Central AC - Early Replacement	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Central AC - Maintenance and Tune-Up	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%
Central Heat Pump - Maintenance	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%
Room AC - Removal of Second Unit	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%	54%
Boiler - Hot Water Reset	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Boiler - Pipe Insulation	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Boiler - Maintenance	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Furnace - Maintenance	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Water Heater - Drainwater Heat Recovery	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Water Heater - Faucet Aerators	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Water Heater - Low-Flow Showerheads	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Water Heater - Pipe Insulation	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Water Heater - Tank Blanket/Insulation	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Water Heater - Thermostat Setback	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Water Heater - Timer	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Water Heater - Desuperheater	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Water Heater - Solar System	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Interior Lighting - Occupancy Sensors	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Exterior Lighting - Photosensor Control	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Exterior Lighting - Photovoltaic Installation	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Exterior Lighting - Timeclock Installation	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Refrigerator - Early Replacement	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Refrigerator - Maintenance	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Refrigerator - Remove Second Unit	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Freezer - Remove Second Unit	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Freezer - Early Replacement	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Freezer - Maintenance	51%	52%	52%	53%	53%	54%	54%	55%	55%	56%	56%
Electronics - Smart Power Strip	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Pool Pump - Timer	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Pool Heater - Solar System	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
ENERGY STAR Home Design	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%
Information Based Energy Efficiency Programs	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Combined Boiler & Water Htg. Unit	55%	56%	56%	57%	57%	58%	58%	59%	59%	60%	60%
Pool/Spa cover	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%

Table E-3 Single Family Electric Only Equipment Customer Measures—(Maximum Achievable Potential factor x Realistic Achievable Potential factor)

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cooling	Electric	Central AC	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Cooling	Electric	Room AC	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Cooling	Electric	Air-Source Heat Pump	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Cooling	Electric	Geothermal Heat Pump	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Cooling	Electric	PTHP	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Heating	Electric	Electric Room Heat	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Heating	Electric	Furnace	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Heating	Electric	Air-Source Heat Pump	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Heating	Electric	Geothermal Heat Pump	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Heating	Electric	PTHP	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Water Heating	Electric	Water Heater <= 55 gal	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%
Water Heating	Electric	Water Heater > 55 gal	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%
Interior Lighting	Electric	Screw-in	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Interior Lighting	Electric	Linear Fluorescent	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Interior Lighting	Electric	Specialty	10%	10%	10%	10%	10%	10%	11%	11%	11%	11%	11%
Exterior Lighting	Electric	Screw-in	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Appliances	Electric	Refrigerator	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Appliances	Electric	Second Refrigerator	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Appliances	Electric	Freezer	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Appliances	Electric	Clothes Washer	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%
Appliances	Electric	Clothes Dryer	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%
Appliances	Electric	Dishwasher	35%	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%
Appliances	Electric	Stove	35%	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%
Appliances	Electric	Microwave	35%	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%
Electronics	Electric	Personal Computers	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Electronics	Electric	Monitor	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Electronics	Electric	Laptops	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Electronics	Electric	TVs	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%
Electronics	Electric	Printer/Fax/Copier	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Electronics	Electric	Set-top Boxes/DVR	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Electronics	Electric	Devices and Gadgets	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Miscellaneous	Electric	Air Purifier/Cleaner	27%	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%
Miscellaneous	Electric	Dehumidifier	27%	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Miscellaneous	Electric	Pool Heater	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Miscellaneous	Electric	Pool Pump	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Miscellaneous	Electric	Hot Tub / Spa	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Miscellaneous	Electric	Well Pump	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Miscellaneous	Electric	Furnace Fan	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Miscellaneous	Electric	Bathroom Exhaust Fan	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Miscellaneous	Electric	Miscellaneous	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%

Table E-4 Single Family Electric Only Customer Non-Equipment Measures—(Maximum Achievable Potential factor x Realistic Achievable Potential factor)

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Insulation - Ceiling	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Insulation - Ducting	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%
Insulation - Foundation	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Insulation - Infiltration Control	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Insulation - Radiant Barrier	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Insulation - Wall Cavity	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Insulation - Wall Sheathing	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Ducting - Repair and Sealing	30%	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%
Windows - High Efficiency/ENERGY STAR	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Windows - Install Reflective Film	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Doors - Storm and Thermal	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Roofs - High Reflectivity	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Attic Fan - Installation	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Attic Fan - Photovoltaic - Installation	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Whole-House Fan - Installation	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Ceiling Fan - Installation	24%	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%
Thermostat - Clock/Programmable	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Home Energy Management System	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Central AC - Early Replacement	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Central AC - Maintenance and Tune-Up	33%	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%
Central Heat Pump - Maintenance	33%	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%
Room AC - Removal of Second Unit	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%
Boiler - Hot Water Reset	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Boiler - Pipe Insulation	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%
Boiler - Maintenance	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%	39%
Furnace - Maintenance	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%	39%
Water Heater - Drainwater Heat Recovery	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%
Water Heater - Faucet Aerators	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Water Heater - Low-Flow Showerheads	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Water Heater - Pipe Insulation	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%
Water Heater - Tank Blanket/Insulation	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%
Water Heater - Thermostat Setback	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Water Heater - Timer	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Water Heater - Desuperheater	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Water Heater - Solar System	37%	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%
Interior Lighting - Occupancy Sensors	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Exterior Lighting - Photosensor Control	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Exterior Lighting - Photovoltaic Installation	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Exterior Lighting - Timeclock Installation	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Refrigerator - Early Replacement	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Refrigerator - Maintenance	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Refrigerator - Remove Second Unit	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Freezer - Remove Second Unit	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Freezer - Early Replacement	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Freezer - Maintenance	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Electronics - Smart Power Strip	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Pool Pump - Timer	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Pool Heater - Solar System	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
ENERGY STAR Home Design	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%
Information Based Energy Efficiency Programs	39%	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%
Combined Boiler & Water Htg. Unit	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Pool/Spa cover	29%	29%	30%	30%	31%	31%	32%	32%	33%	33%	34%

Table E-5 Multi Family Electric Only Customer Equipment Measures—(Maximum Achievable Potential factor)

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cooling	Electric	Central AC	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Cooling	Electric	Room AC	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Cooling	Electric	Air-Source Heat Pump	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Cooling	Electric	Geothermal Heat Pump	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Cooling	Electric	PTHP	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Heating	Electric	Electric Room Heat	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Heating	Electric	Furnace	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Heating	Electric	Air-Source Heat Pump	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Heating	Electric	Geothermal Heat Pump	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Heating	Electric	PTHP	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Water Heating	Electric	Water Heater <= 55 gal	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%	46%
Water Heating	Electric	Water Heater > 55 gal	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%	46%
Interior Lighting	Electric	Screw-in	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Interior Lighting	Electric	Linear Fluorescent	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Interior Lighting	Electric	Specialty	12%	12%	12%	13%	13%	13%	13%	13%	13%	13%	13%
Exterior Lighting	Electric	Screw-in	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Appliances	Electric	Refrigerator	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Appliances	Electric	Second Refrigerator	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Appliances	Electric	Freezer	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Appliances	Electric	Clothes Washer	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%	48%
Appliances	Electric	Clothes Dryer	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%	48%
Appliances	Electric	Dishwasher	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Appliances	Electric	Stove	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Appliances	Electric	Microwave	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Electronics	Electric	Personal Computers	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Electronics	Electric	Monitor	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Electronics	Electric	Laptops	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Electronics	Electric	TVs	41%	42%	42%	43%	43%	44%	44%	45%	45%	46%	46%
Electronics	Electric	Printer/Fax/Copier	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Electronics	Electric	Set-top Boxes/DVR	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%
Electronics	Electric	Devices and Gadgets	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Miscellaneous	Electric	Air Purifier/Cleaner	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Miscellaneous	Electric	Dehumidifier	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Miscellaneous	Electric	Pool Heater	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Miscellaneous	Electric	Pool Pump	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Miscellaneous	Electric	Hot Tub / Spa	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Miscellaneous	Electric	Well Pump	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Miscellaneous	Electric	Furnace Fan	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Miscellaneous	Electric	Bathroom Exhaust Fan	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Miscellaneous	Electric	Miscellaneous	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%

Table E-6 Multi Family Electric Only Customer Non-Equipment Measures—(Maximum Achievable Potential factor)

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Insulation - Ceiling	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Insulation - Ducting	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Insulation - Foundation	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Insulation - Infiltration Control	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Insulation - Radiant Barrier	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Insulation - Wall Cavity	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Insulation - Wall Sheathing	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Ducting - Repair and Sealing	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%	43%
Windows - High Efficiency/ENERGY STAR	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Windows - Install Reflective Film	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Doors - Storm and Thermal	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%	41%
Roofs - High Reflectivity	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Attic Fan - Installation	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Attic Fan - Photovoltaic - Installation	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Whole-House Fan - Installation	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Ceiling Fan - Installation	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Thermostat - Clock/Programmable	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%
Home Energy Management System	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%
Central AC - Early Replacement	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Central AC - Maintenance and Tune-Up	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Central Heat Pump - Maintenance	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%
Room AC - Removal of Second Unit	42%	43%	43%	44%	44%	45%	45%	46%	46%	47%	47%
Boiler - Hot Water Reset	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%
Boiler - Pipe Insulation	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Boiler - Maintenance	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%	29%
Furnace - Maintenance	24%	25%	25%	26%	26%	27%	27%	28%	28%	29%	29%
Water Heater - Drainwater Heat Recovery	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Water Heater - Faucet Aerators	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Water Heater - Low-Flow Showerheads	40%	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%
Water Heater - Pipe Insulation	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Water Heater - Tank Blanket/Insulation	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%	41%
Water Heater - Thermostat Setback	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%
Water Heater - Timer	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%
Water Heater - Desuperheater	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%	46%

Measures	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Water Heater - Solar System	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%	46%
Interior Lighting - Occupancy Sensors	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Exterior Lighting - Photosensor Control	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Exterior Lighting - Photovoltaic Installation	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Exterior Lighting - Timeclock Installation	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%
Refrigerator - Early Replacement	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Refrigerator - Maintenance	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Refrigerator - Remove Second Unit	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Freezer - Remove Second Unit	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Freezer - Early Replacement	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Freezer - Maintenance	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%
Electronics - Smart Power Strip	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%	38%
Pool Pump - Timer	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
Pool Heater - Solar System	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%
ENERGY STAR Home Design	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Information Based Energy Efficiency Programs	49%	49%	50%	50%	51%	51%	52%	52%	53%	53%	54%
Combined Boiler & Water Htg. Unit	48%	48%	49%	49%	50%	50%	51%	51%	52%	52%	53%
Pool/Spa cover	38%	38%	39%	39%	40%	40%	41%	41%	42%	42%	43%

Table E-7 Multi Family Electric Only Customer Equipment Measures—(Maximum Achievable Potential factor x Realistic Achievable Potential factor)

End Use	Fuel	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cooling	Electric	Central AC	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Cooling	Electric	Room AC	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Cooling	Electric	Air-Source Heat Pump	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Cooling	Electric	Geothermal Heat Pump	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Cooling	Electric	PTHP	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Heating	Electric	Electric Room Heat	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Heating	Electric	Furnace	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%	36%
Heating	Electric	Air-Source Heat Pump	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Heating	Electric	Geothermal Heat Pump	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Heating	Electric	PTHP	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Water Heating	Electric	Water Heater <= 55 gal	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Water Heating	Electric	Water Heater > 55 gal	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Interior Lighting	Electric	Screw-in	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%
Interior Lighting	Electric	Linear Fluorescent	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%
Interior Lighting	Electric	Specialty	10%	10%	10%	10%	11%	11%	11%	11%	11%	11%	11%
Exterior Lighting	Electric	Screw-in	40%	41%	41%	42%	42%	43%	43%	44%	44%	45%	45%
Appliances	Electric	Refrigerator	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%
Appliances	Electric	Second Refrigerator	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%
Appliances	Electric	Freezer	35%	36%	36%	37%	37%	38%	38%	39%	39%	40%	40%
Appliances	Electric	Clothes Washer	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Appliances	Electric	Clothes Dryer	32%	32%	33%	33%	34%	34%	35%	35%	36%	36%	37%
Appliances	Electric	Dishwasher	27%	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%
Appliances	Electric	Stove	27%	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%
Appliances	Electric	Microwave	27%	27%	28%	28%	29%	29%	30%	30%	31%	31%	32%
Electronics	Electric	Personal Computers	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Electronics	Electric	Monitor	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Electronics	Electric	Laptops	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Electronics	Electric	TVs	30%	31%	31%	32%	32%	33%	33%	34%	34%	35%	35%
Electronics	Electric	Printer/Fax/Copier	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Electronics	Electric	Set-top Boxes/DVR	33%	33%	34%	34%	35%	35%	36%	36%	37%	37%	38%
Electronics	Electric	Devices and Gadgets	28%	28%	29%	29%	30%	30%	31%	31%	32%	32%	33%
Miscellaneous	Electric	Air Purifier/Cleaner	23%	23%	24%	24%	25%	25%	26%	26%	27%	27%	28%
Miscellaneous	Electric	Dehumidifier	23%	23%	24%	24%	25%	25%	26%	26%	27%	27%	28%