

New Jersey's Clean Energy Program

LGEA Exit Meeting for:
Bergen Community College

February 26, 2020



NJCEP INTRODUCTIONS

Aimee Lalonde– TRC Program Manager

Sarah Landis – TRC Auditor

Amanda Muench – TRC Account Manager

Mike Mandzik – TRC Outreach Account Manager

Arif Welcher – BPU Government/Business Manager

Michelle Rossi – BPU ESIP Coordinator



AGENDA

- The audit process overview
- Energy use & existing conditions
- Review of **E**nergy **C**onservation **M**easures (ECMs) identified
- Questions regarding the draft audit report
- Overview of NJCEP equipment incentives
- Next steps for Bergen Community College



LGEA PROCESS

- Application Approval
- Scheduling Call
- Audit
- Benchmarking & Analysis
- Draft Report
- Exit Meeting Presentation
- Final Report

SITE VISIT & UTILITY ANALYSIS

Overview of Systems, Baseline & Existing Conditions:

- Lighting System
- HVAC and Mechanical Systems
- Plug Load Equipment
- Energy Management System

Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs

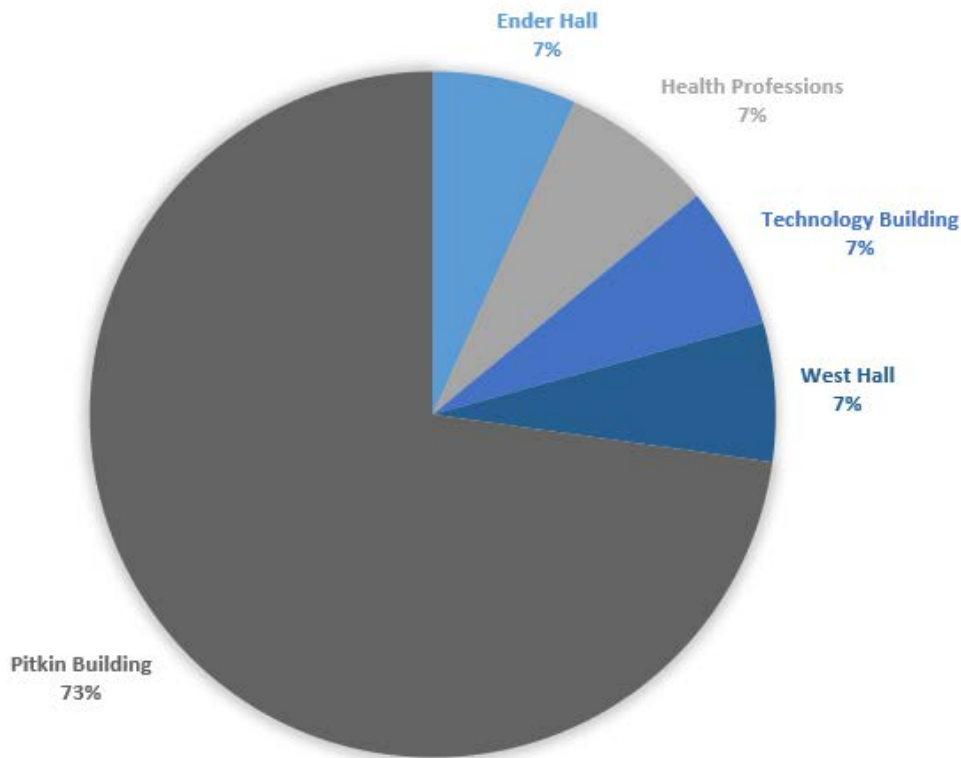
Sites Visited/Analyzed

- Pitkin Building
- West Hall
- Technology Building
- Ender Hall
- Health Professions Building

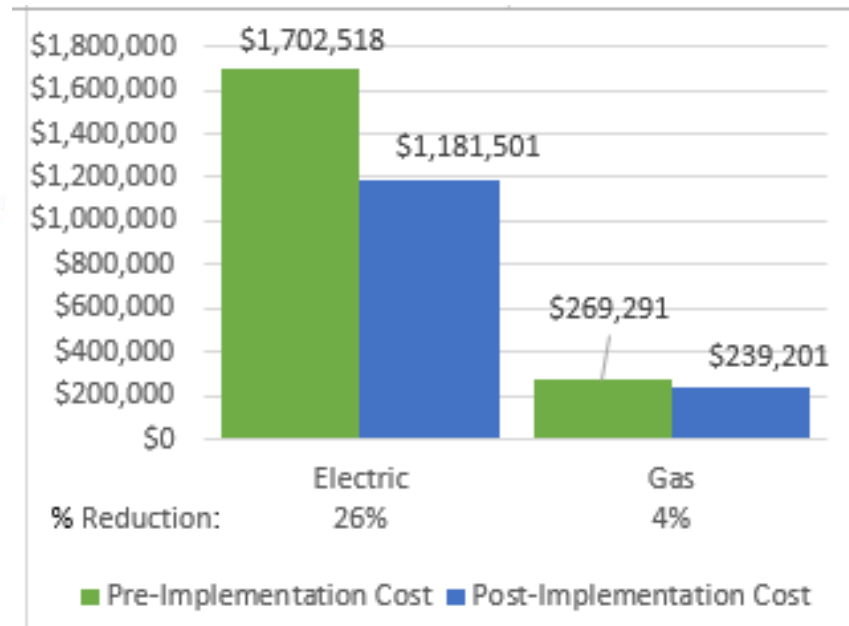


UTILITY BREAKOUT


Percent of Total Annual Energy Costs



Pre & Post Implementation Cost



BENCHMARKING

 **ENERGY STAR® Statement of Energy Performance**
LEARN MORE AT energystar.gov

N/A **Bergen Community College - Campus**
Primary Property Type: College/University
Gross Floor Area (ft²): 867,229
Built: 1987

For Year Ending: January 31, 2019
Date Generated: July 12, 2019

ENERGY STAR® Score¹

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information		
Property Address Bergen Community College - Campus 400 Paramus Road Paramus, New Jersey 07652	Property Owner Bergen Community College 400 Paramus Road Paramus, NJ 07652 (201) 879-8921	Primary Contact Victor Anaya 400 Paramus Road Paramus, NJ 07652 (201) 879-8921 vanaya@bergen.edu
Property ID: 7384792		
Energy Consumption and Energy Use Intensity (EUI)		
Site EUI 101.5 kBtu/ft ²	Annual Energy by Fuel Natural Gas (kBtu) 37,546,840 (43%) Electric - Grid (kBtu) 50,490,655 (57%)	National Median Comparison National Median Site EUI (kBtu/ft ²) 87.9 National Median Source EUI (kBtu/ft ²) 180.6 % Diff from National Median Source EUI 15%
Source EUI 208.5 kBtu/ft ²	Annual Emissions Greenhouse Gas Emissions (Metric Tons CO2e/year) 7,110	

Site EUI
101.5 kBtu/ft²

National Median Comparison	
National Median Site EUI (kBtu/ft ²)	87.9
National Median Source EUI (kBtu/ft ²)	180.6
% Diff from National Median Source EUI	15%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	7,110

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

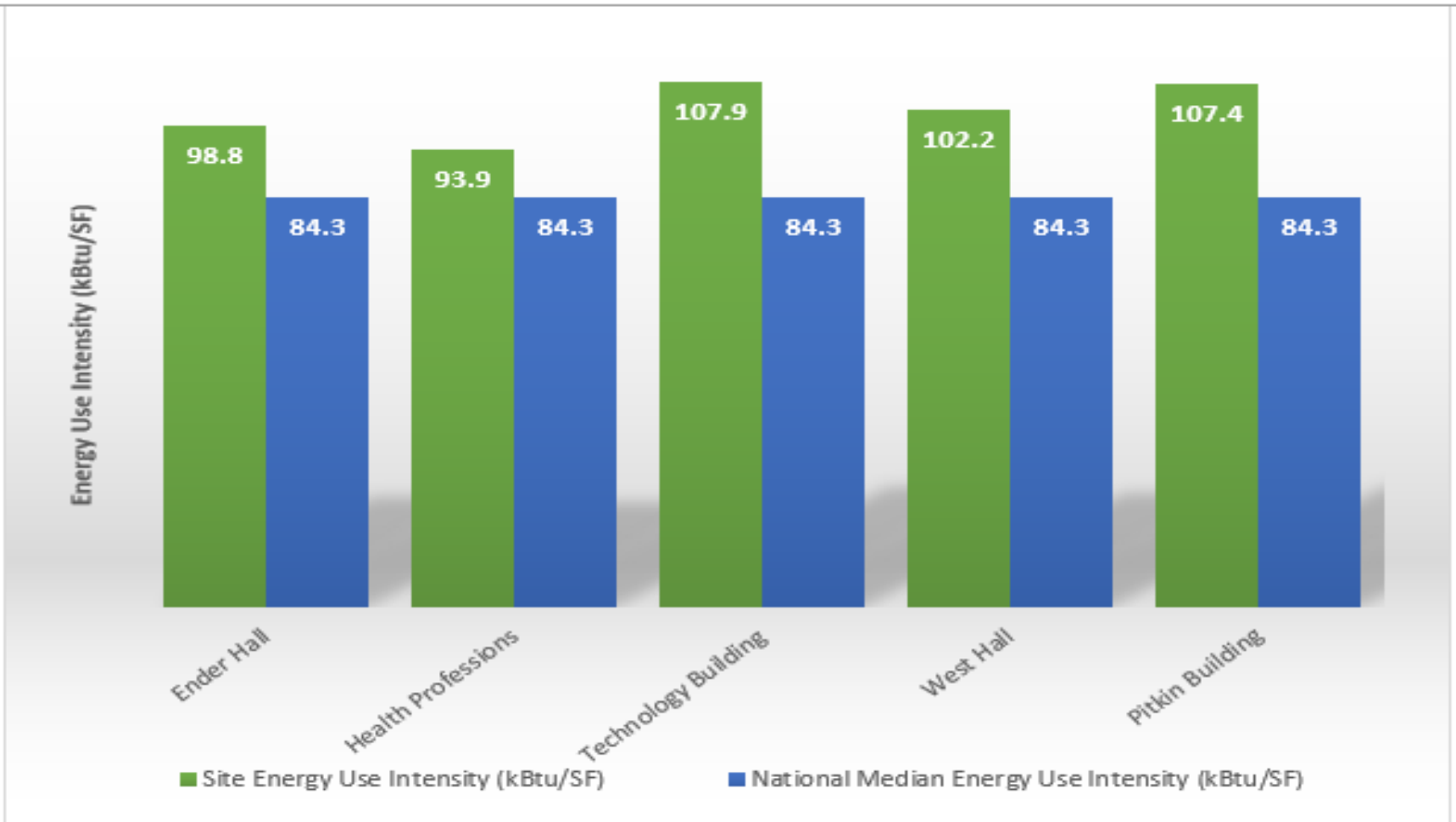
Signature: _____ Date: _____

Licensed Professional

Professional Engineer Stamp (if applicable)

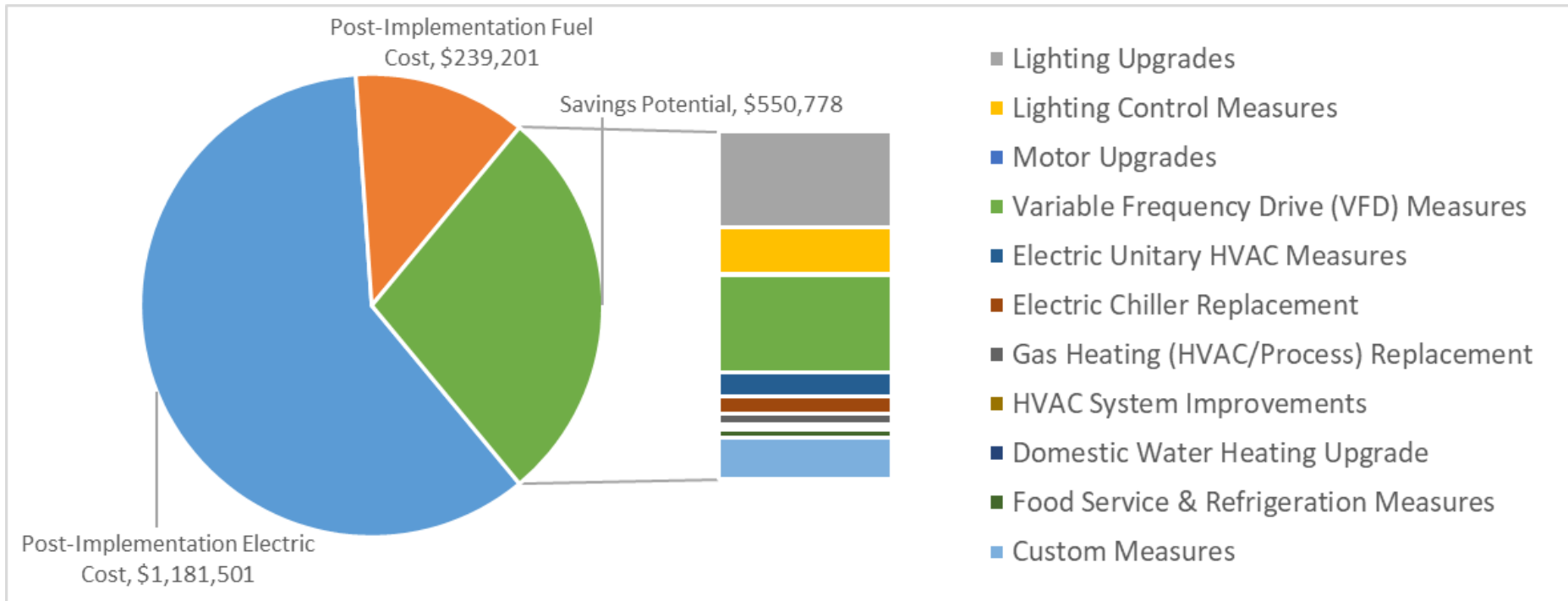
Site Name	Energy Star Score
Pitkin Building	N/A
West Hall	
Technology Building	
Ender Hall	
Health Professions Building	

BENCHMARKING



ALL OPPORTUNITIES

Savings Potential



ALL OPPORTUNITIES

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		1,363,195	186.0	-265.8	\$152,226	\$427,775	\$74,141	\$353,634	2.3	1,341,603
ECM 1	Install LED Fixtures	86,421	2.4	-6.4	\$9,721	\$70,567	\$8,395	\$62,172	6.4	86,273
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	271,354	38.2	-56.7	\$30,280	\$69,227	\$9,326	\$59,901	2.0	266,608
ECM 3	Retrofit Fixtures with LED Lamps	1,005,420	145.5	-202.7	\$112,225	\$287,980	\$56,420	\$231,560	2.1	988,722
Lighting Control Measures		659,028	79.7	-137.8	\$73,535	\$353,134	\$108,240	\$244,894	3.3	647,501
ECM 4	Install Occupancy Sensor Lighting Controls	419,858	60.7	-87.8	\$46,852	\$247,934	\$30,400	\$217,534	4.6	412,514
ECM 5	Install Daylight Dimming/Photocell Controls	3,730	0.3	-0.8	\$416	\$1,250	\$1,175	\$75	0.2	3,664
ECM 6	Install High/Low Lighting Controls	235,440	18.7	-49.2	\$26,267	\$103,950	\$76,665	\$27,285	1.0	231,322
Motor Upgrades		11,203	3.5	0.0	\$1,266	\$59,950	\$0	\$59,950	47.4	11,281
ECM 7	Premium Efficiency Motors	11,203	3.5	0.0	\$1,266	\$59,950	\$0	\$59,950	47.4	11,281
Variable Frequency Drive (VFD) Measures		1,365,366	352.2	130.3	\$155,129	\$825,809	\$89,208	\$736,601	4.7	1,390,174
ECM 8	Install VFD on Variable Air Volume (VAV) Fans	12,415	4.2	0.0	\$1,403	\$14,835	\$1,938	\$12,897	9.2	12,502
ECM 9	Install VFDs on Constant Volume (CV) Fans	939,729	232.4	0.0	\$106,174	\$521,341	\$63,120	\$458,221	4.3	946,300
ECM 10	Install VFDs on Chilled Water Pumps	189,073	83.1	0.0	\$21,362	\$151,090	\$22,200	\$128,890	6.0	190,395
ECM 11	Install VFDs on Heating Water Pumps	207,254	30.0	0.0	\$23,416	\$111,139	\$0	\$111,139	4.7	208,703
ECM 12	Install Boiler Draft Fan VFDs	4,023	1.0	0.0	\$455	\$12,172	\$0	\$12,172	26.8	4,051
ECM 13	Install VFDs on Kitchen Hood Fan Motors	12,872	1.6	130.3	\$2,320	\$15,232	\$1,950	\$13,282	5.7	28,223

ALL OPPORTUNITIES

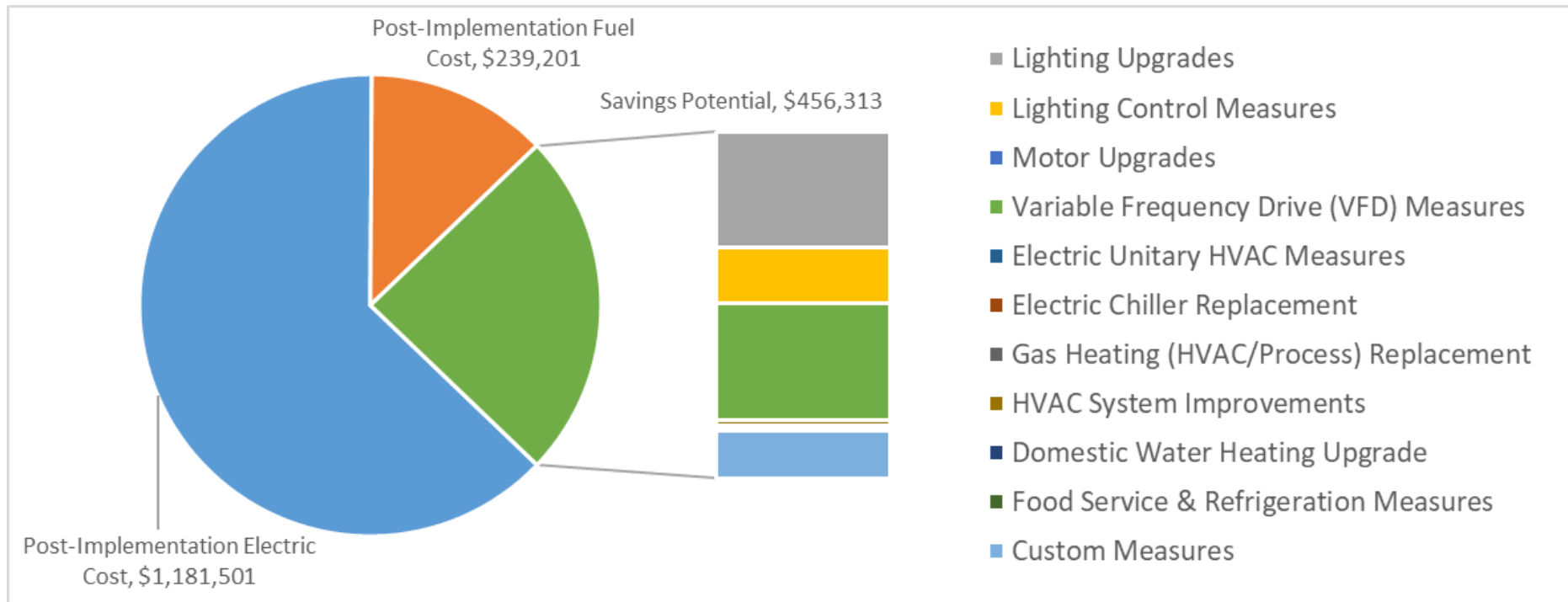
#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		335,317	139.9	0.0	\$37,885	\$2,400,032	\$32,737	\$2,367,295	62.5	337,661
ECM 14	Install High Efficiency Air Conditioning Units	335,317	139.9	0.0	\$37,885	\$2,400,032	\$32,737	\$2,367,295	62.5	337,661
ECM 15	Install High Efficiency Chillers	238,822	147.6	0.0	\$26,983	\$869,958	\$41,150	\$828,808	30.7	240,492
Gas Heating (HVAC/Process) Replacement		0	0.0	2,611.3	\$17,399	\$650,598	\$30,115	\$620,484	35.7	305,750
ECM 16	Install High Efficiency Hot Water Boilers	0	0.0	950.2	\$6,338	\$255,174	\$14,515	\$240,660	38.0	111,252
ECM 17	Install High Efficiency Furnaces	0	0.0	1,661.1	\$11,061	\$395,424	\$15,600	\$379,824	34.3	194,498
HVAC System Improvements		36,096	0.0	367.6	\$6,530	\$35,359	\$4	\$35,355	5.4	79,390
ECM 18	Implement Demand Control Ventilation (DCV)	36,096	0.0	366.0	\$6,520	\$35,345	\$0	\$35,345	5.4	79,204
ECM 19	Install Pipe Insulation	0	0.0	1.6	\$11	\$14	\$4	\$10	1.0	186
Domestic Water Heating Upgrade		0	0.0	147.3	\$982	\$19,913	\$396	\$19,517	19.9	17,249
ECM 20	Install High Efficiency Gas-Fired Water Heater	0	0.0	54.2	\$361	\$19,203	\$0	\$19,203	53.2	6,341
ECM 21	Install Low-Flow DHW Devices	0	0.0	93.2	\$621	\$710	\$396	\$314	0.5	10,908

ALL OPPORTUNITIES

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		101,535	11.7	220.7	\$12,944	\$188,408	\$18,491	\$169,917	13.1	128,089
ECM 22	Food Service Equipment Replacement	2,867	0.7	220.7	\$1,796	\$83,447	\$12,496	\$70,951	39.5	28,731
ECM 23	Dishwasher Replacement	19,235	2.2	0.0	\$2,173	\$18,859	\$700	\$18,159	8.4	19,370
ECM 24	Refrigerator/Freezer Case Electrically Commutated Motors	1,843	0.2	0.0	\$208	\$2,426	\$320	\$2,106	10.1	1,856
ECM 25	Refrigeration Display Case Doors or Covers	5,282	0.6	0.0	\$597	\$2,341	\$350	\$1,991	3.3	5,319
ECM 26	Refrigeration Controls	2,793	0.2	0.0	\$316	\$10,096	\$475	\$9,621	30.5	2,813
ECM 27	Replace Refrigeration Equipment	38,084	4.3	0.0	\$4,303	\$65,259	\$2,850	\$62,409	14.5	38,350
ECM 28	Vending Machine Control	31,431	3.6	0.0	\$3,551	\$5,980	\$1,300	\$4,680	1.3	31,651
Custom Measures		500,903	0.0	1,396.3	\$65,899	\$1,202,557	\$0	\$1,202,557	18.2	667,898
ECM 29	Replace Energy Management System	399,518	0.0	1,078.9	\$52,336	\$928,650	\$0	\$928,650	17.7	528,637
ECM 30	Upgrade/Replace Energy Management System	101,386	0.0	317.4	\$13,563	\$273,907	\$0	\$273,907	20.2	139,260
TOTALS		4,611,465	920.7	4,470.0	\$550,778	\$7,033,493	\$394,481	\$6,639,012	12.1	5,167,088

COST EFFECTIVE OPPORTUNITIES

Savings Potential



COST EFFECTIVE OPPORTUNITIES

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades		1,363,195	186.0	-265.8	\$152,226	\$427,775	\$74,141	\$353,634	2.3	1,341,603
ECM 1	Install LED Fixtures	86,421	2.4	-6.4	\$9,721	\$70,567	\$8,395	\$62,172	6.4	86,273
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	271,354	38.2	-56.7	\$30,280	\$69,227	\$9,326	\$59,901	2.0	266,608
ECM 3	Retrofit Fixtures with LED Lamps	1,005,420	145.5	-202.7	\$112,225	\$287,980	\$56,420	\$231,560	2.1	988,722
Lighting Control Measures		659,028	79.7	-137.8	\$73,535	\$353,134	\$108,240	\$244,894	3.3	647,501
ECM 4	Install Occupancy Sensor Lighting Controls	419,858	60.7	-87.8	\$46,852	\$247,934	\$30,400	\$217,534	4.6	412,514
ECM 5	Install Daylight Dimming/Photocell Controls	3,730	0.3	-0.8	\$416	\$1,250	\$1,175	\$75	0.2	3,664
ECM 6	Install High/Low Lighting Controls	235,440	18.7	-49.2	\$26,267	\$103,950	\$76,665	\$27,285	1.0	231,322
Variable Frequency Drive (VFD) Measures		1,361,343	351.3	130.3	\$154,674	\$813,636	\$89,208	\$724,429	4.7	1,386,123
ECM 8	Install VFD on Variable Air Volume (VAV) Fans	12,415	4.2	0.0	\$1,403	\$14,835	\$1,938	\$12,897	9.2	12,502
ECM 9	Install VFDs on Constant Volume (CV) Fans	939,729	232.4	0.0	\$106,174	\$521,341	\$63,120	\$458,221	4.3	946,300
ECM 10	Install VFDs on Chilled Water Pumps	189,073	83.1	0.0	\$21,362	\$151,090	\$22,200	\$128,890	6.0	190,395
ECM 11	Install VFDs on Heating Water Pumps	207,254	30.0	0.0	\$23,416	\$111,139	\$0	\$111,139	4.7	208,703
ECM 13	Install VFDs on Kitchen Hood Fan Motors	12,872	1.6	130.3	\$2,320	\$15,232	\$1,950	\$13,282	5.7	28,223
HVAC System Improvements		36,096	0.0	367.6	\$6,530	\$35,359	\$4	\$35,355	5.4	79,390
ECM 18	Implement Demand Control Ventilation (DCV)	36,096	0.0	366.0	\$6,520	\$35,345	\$0	\$35,345	5.4	79,204
ECM 19	Install Pipe Insulation	0	0.0	1.6	\$11	\$14	\$4	\$10	1.0	186

COST EFFECTIVE OPPORTUNITIES

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO _{2e} Emissions Reduction (lbs)
Domestic Water Heating Upgrade		0	0.0	93.2	\$621	\$710	\$396	\$314	0.5	10,908
ECM 21	Install Low-Flow DHW Devices	0	0.0	93.2	\$621	\$710	\$396	\$314	0.5	10,908
Food Service & Refrigeration Measures		60,549	6.9	0.0	\$6,841	\$30,443	\$2,510	\$27,933	4.1	60,973
ECM 23	Dishwasher Replacement	19,235	2.2	0.0	\$2,173	\$18,859	\$700	\$18,159	8.4	19,370
ECM 24	Refrigerator/Freezer Case Electrically Commutated Motors	1,050	0.1	0.0	\$119	\$1,213	\$160	\$1,053	8.9	1,057
ECM 25	Refrigeration Display Case Doors or Covers	5,282	0.6	0.0	\$597	\$2,341	\$350	\$1,991	3.3	5,319
ECM 27	Replace Refrigeration Equipment	3,551	0.4	0.0	\$401	\$2,050	\$0	\$2,050	5.1	3,576
ECM 28	Vending Machine Control	31,431	3.6	0.0	\$3,551	\$5,980	\$1,300	\$4,680	1.3	31,651
Custom Measures		472,207	0.0	1,280.3	\$61,886	\$1,103,509	\$0	\$1,103,509	17.8	625,412
ECM 29	Replace Energy Management System	399,518	0.0	1,078.9	\$52,336	\$928,650	\$0	\$928,650	17.7	528,637
ECM 30	Upgrade/Replace Energy Management System	72,689	0.0	201.4	\$9,550	\$174,859	\$0	\$174,859	18.3	96,775
TOTALS		3,952,418	623.9	1,467.8	\$456,313	\$2,764,567	\$274,499	\$2,490,068	5.5	4,151,910

PITKIN BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			1,025,443	131.3	-198	\$114,538	\$309,402	\$52,398	\$257,004	2.2	1,009,443
ECM 1	Install LED Fixtures	Yes	77,292	2.4	-6	\$8,690	\$59,650	\$7,000	\$52,650	6.1	77,080
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	269,937	38.0	-56	\$30,122	\$68,922	\$9,276	\$59,646	2.0	265,216
ECM 3	Retrofit Fixtures with LED Lamps	Yes	678,214	91.0	-135	\$75,726	\$180,830	\$36,122	\$144,708	1.9	667,147
Lighting Control Measures			520,896	62.5	-109	\$58,126	\$274,148	\$80,685	\$193,463	3.3	511,786
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	334,783	47.9	-70	\$37,358	\$203,648	\$25,030	\$178,618	4.8	328,928
ECM 5	Install Daylight Dimming/Photocell Controls	Yes	2,968	0.2	-1	\$331	\$750	\$675	\$75	0.2	2,916
ECM 6	Install High/Low Lighting Controls	Yes	183,145	14.4	-38	\$20,437	\$69,750	\$54,980	\$14,770	0.7	179,942
Motor Upgrades			11,203	3.5	0	\$1,266	\$59,950	\$0	\$59,950	47.4	11,281
ECM 7	Premium Efficiency Motors	No	11,203	3.5	0	\$1,266	\$59,950	\$0	\$59,950	47.4	11,281
Variable Frequency Drive (VFD) Measures			1,132,009	281.3	0	\$127,898	\$589,563	\$68,740	\$520,823	4.1	1,139,924
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	726,641	166.1	0	\$82,098	\$314,798	\$45,040	\$269,758	3.3	731,722
ECM 9	Install VFDs on Chilled Water Pumps	Yes	189,073	83.1	0	\$21,362	\$151,090	\$22,200	\$128,890	6.0	190,395
ECM 10	Install VFDs on Heating Water Pumps	Yes	203,830	29.6	0	\$23,029	\$104,358	\$0	\$104,358	4.5	205,256
ECM 11	Install Boiler Draft Fan VFDs	No	4,023	1.0	0	\$455	\$12,172	\$0	\$12,172	26.8	4,051
ECM 12	Install VFDs on Kitchen Hood Fan Motors	Yes	8,441	1.6	0	\$954	\$7,145	\$1,500	\$5,645	5.9	8,500
Electric Unitary HVAC Measures			158,968	72.6	0	\$17,961	\$1,385,618	\$13,138	\$1,372,480	76.4	160,079
ECM 13	Install High Efficiency Air Conditioning Units	No	158,968	72.6	0	\$17,961	\$1,385,618	\$13,138	\$1,372,480	76.4	160,079
Electric Chiller Replacement			238,822	147.6	0	\$26,983	\$869,958	\$41,150	\$828,808	30.7	240,492
ECM 14	Install High Efficiency Chillers	No	238,822	147.6	0	\$26,983	\$869,958	\$41,150	\$828,808	30.7	240,492

PITKIN BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement			0	0.0	1,935	\$12,907	\$358,435	\$20,915	\$337,521	26.2	226,537
ECM 15	Install High Efficiency Hot Water Boilers	No	0	0.0	950	\$6,338	\$255,174	\$14,515	\$240,660	38.0	111,252
ECM 16	Install High Efficiency Furnaces	No	0	0.0	985	\$6,568	\$103,261	\$6,400	\$96,861	14.7	115,285
HVAC System Improvements			36,096	0.0	366	\$6,520	\$35,345	\$0	\$35,345	5.4	79,204
ECM 17	Implement Demand Control Ventilation (DCV)	Yes	36,096	0.0	366	\$6,520	\$35,345	\$0	\$35,345	5.4	79,204
Domestic Water Heating Upgrade			0	0.0	126	\$842	\$19,748	\$304	\$19,444	23.1	14,785
ECM 18	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	54	\$361	\$19,203	\$0	\$19,203	53.2	6,341
ECM 19	Install Low-Flow DHW Devices	Yes	0	0.0	72	\$481	\$545	\$304	\$241	0.5	8,444
Food Service & Refrigeration Measures			90,381	10.6	221	\$11,684	\$179,203	\$17,906	\$161,297	13.8	116,857
ECM 20	Food Service Equipment Replacement	No	2,867	0.7	221	\$1,796	\$83,447	\$12,496	\$70,951	39.5	28,731
ECM 21	Dishwasher Replacement	Yes	19,235	2.2	0	\$2,173	\$18,859	\$700	\$18,159	8.4	19,370
ECM 22	Refrigerator/Freezer Case Electrically Commutated Motors	No	793	0.1	0	\$90	\$1,213	\$160	\$1,053	11.8	799
ECM 23	Refrigeration Display Case Doors or Covers	Yes	5,282	0.6	0	\$597	\$2,341	\$350	\$1,991	3.3	5,319
ECM 24	Refrigeration Controls	No	1,076	0.1	0	\$122	\$5,074	\$250	\$4,824	39.7	1,084
ECM 25	Replace Refrigeration Equipment	No	34,532	3.9	0	\$3,902	\$63,209	\$2,850	\$60,359	15.5	34,774
ECM 26	Vending Machine Control	Yes	26,595	3.0	0	\$3,005	\$5,060	\$1,100	\$3,960	1.3	26,781
Custom Measures			399,518	0.0	1,079	\$52,336	\$928,650	\$0	\$928,650	17.7	528,637
ECM 27	Upgrade/Replace Energy Management System	Yes	399,518	0.0	1,079	\$52,336	\$928,650	\$0	\$928,650	17.7	528,637
TOTALS (COST EFFECTIVE MEASURES)			3,161,050	480.0	1,210	\$365,219	\$2,151,741	\$204,277	\$1,947,464	5.3	3,324,857
TOTALS (ALL MEASURES)			3,613,335	709.5	3,420	\$431,060	\$5,010,020	\$295,236	\$4,714,784	10.9	4,039,025

WEST HALL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			82,487	11.5	-15	\$9,222	\$30,079	\$5,633	\$24,446	2.7	81,338
ECM 1	Install LED Fixtures	Yes	9,129	0.0	0	\$1,031	\$10,917	\$1,395	\$9,522	9.2	9,193
ECM 2	Retrofit Fixtures with LED Lamps	Yes	73,358	11.5	-15	\$8,190	\$19,162	\$4,238	\$14,924	1.8	72,145
Lighting Control Measures			26,664	3.3	-6	\$2,976	\$22,531	\$7,800	\$14,731	5.0	26,198
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	16,247	2.4	-3	\$1,813	\$11,456	\$1,455	\$10,001	5.5	15,962
ECM 4	Install Daylight Dimming/Photocell Controls	Yes	762	0.1	0	\$85	\$500	\$500	\$0	0.0	749
ECM 5	Install High/Low Lighting Controls	Yes	9,656	0.7	-2	\$1,078	\$10,575	\$5,845	\$4,730	4.4	9,487
Variable Frequency Drive (VFD) Measures			12,415	4.2	0	\$1,403	\$14,835	\$1,938	\$12,897	9.2	12,502
ECM 6	Install VFD on Variable Air Volume (VAV) Fans	Yes	12,415	4.2	0	\$1,403	\$14,835	\$1,938	\$12,897	9.2	12,502
Electric Unitary HVAC Measures			14,642	10.5	0	\$1,654	\$143,825	\$3,315	\$140,510	84.9	14,745
ECM 7	Install High Efficiency Air Conditioning Units	No	14,642	10.5	0	\$1,654	\$143,825	\$3,315	\$140,510	84.9	14,745
Gas Heating (HVAC/Process) Replacement			0	0.0	32	\$212	\$4,599	\$400	\$4,199	19.8	3,739
ECM 8	Install High Efficiency Furnaces	No	0	0.0	32	\$212	\$4,599	\$400	\$4,199	19.8	3,739
Domestic Water Heating Upgrade			0	0.0	12	\$77	\$93	\$52	\$41	0.5	1,353
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	12	\$77	\$93	\$52	\$41	0.5	1,353
Food Service & Refrigeration Measures			1,209	0.1	0	\$137	\$230	\$50	\$180	1.3	1,217
ECM 10	Vending Machine Control	Yes	1,209	0.1	0	\$137	\$230	\$50	\$180	1.3	1,217
Custom Measures			41,537	0.0	105	\$5,393	\$90,002	\$0	\$90,002	16.7	54,175
ECM 11	Upgrade/Replace Energy Management System	Yes	41,537	0.0	105	\$5,393	\$90,002	\$0	\$90,002	16.7	54,175
TOTALS (COST EFFECTIVE MEASURES)			164,313	19.0	97	\$19,207	\$157,770	\$15,473	\$142,298	7.4	176,783
TOTALS (ALL MEASURES)			178,955	29.5	129	\$21,073	\$306,195	\$19,187	\$287,008	13.6	195,267

TECHNOLOGY BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			90,236	13.4	-19	\$10,071	\$19,224	\$4,367	\$14,857	1.5	88,677
ECM 1	Retrofit Fixtures with LED Lamps	Yes	90,236	13.4	-19	\$10,071	\$19,224	\$4,367	\$14,857	1.5	88,677
Lighting Control Measures			45,557	6.6	-10	\$5,084	\$23,814	\$7,305	\$16,509	3.2	44,760
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	36,933	5.5	-8	\$4,122	\$14,814	\$1,795	\$13,019	3.2	36,287
ECM 3	Install High/Low Lighting Controls	Yes	8,623	1.0	-2	\$962	\$9,000	\$5,510	\$3,490	3.6	8,472
Variable Frequency Drive (VFD) Measures			104,470	34.1	0	\$11,803	\$99,832	\$9,120	\$90,712	7.7	105,201
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	101,047	33.6	0	\$11,417	\$93,051	\$9,120	\$83,931	7.4	101,754
ECM 5	Install VFDs on Heating Water Pumps	Yes	3,423	0.4	0	\$387	\$6,781	\$0	\$6,781	17.5	3,447
Electric Unitary HVAC Measures			111,108	34.3	0	\$12,553	\$579,823	\$2,633	\$577,190	46.0	111,885
ECM 6	Install High Efficiency Air Conditioning Units	No	111,108	34.3	0	\$12,553	\$579,823	\$2,633	\$577,190	46.0	111,885
Gas Heating (HVAC/Process) Replacement			0	0.0	266	\$1,765	\$87,185	\$3,200	\$83,985	47.6	31,122
ECM 7	Install High Efficiency Furnaces	No	0	0.0	266	\$1,765	\$87,185	\$3,200	\$83,985	47.6	31,122
Food Service & Refrigeration Measures			1,968	0.2	0	\$222	\$2,207	\$165	\$2,042	9.2	1,982
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	264	0.0	0	\$30	\$303	\$40	\$263	8.8	265
ECM 9	Refrigeration Controls	No	496	0.0	0	\$56	\$1,674	\$75	\$1,599	28.5	499
ECM 10	Vending Machine Control	Yes	1,209	0.1	0	\$137	\$230	\$50	\$180	1.3	1,217
Custom Measures			31,152	0.0	96	\$4,157	\$84,857	\$0	\$84,857	20.4	42,600
ECM 11	Upgrade/Replace Energy Management System	Yes	31,152	0.0	96	\$4,157	\$84,857	\$0	\$84,857	20.4	42,600
TOTALS (COST EFFECTIVE MEASURES)			272,888	54.2	68	\$31,281	\$228,260	\$20,882	\$207,378	6.6	282,720
TOTALS (ALL MEASURES)			384,491	88.5	333	\$45,655	\$896,942	\$26,790	\$870,153	19.1	426,226

ENDER HALL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			96,530	15.5	-20	\$10,772	\$20,604	\$4,947	\$15,657	1.5	94,842
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,417	0.2	0	\$158	\$305	\$50	\$255	1.6	1,393
ECM 2	Retrofit Fixtures with LED Lamps	Yes	95,112	15.3	-20	\$10,614	\$20,299	\$4,897	\$15,402	1.5	93,449
Lighting Control Measures			47,437	5.9	-10	\$5,294	\$22,246	\$5,240	\$17,006	3.2	46,607
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	31,290	4.7	-7	\$3,492	\$17,746	\$2,120	\$15,626	4.5	30,742
ECM 4	Install High/Low Lighting Controls	Yes	16,147	1.2	-3	\$1,802	\$4,500	\$3,120	\$1,380	0.8	15,865
Variable Frequency Drive (VFD) Measures			116,472	32.7	130	\$14,025	\$121,578	\$9,410	\$112,168	8.0	132,547
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	112,040	32.7	0	\$12,659	\$113,492	\$8,960	\$104,532	8.3	112,824
ECM 6	Install VFDs on Kitchen Hood Fan Motors	Yes	4,431	0.0	130	\$1,366	\$8,087	\$450	\$7,637	5.6	19,724
Electric Unitary HVAC Measures			50,599	22.5	0	\$5,717	\$290,766	\$13,652	\$277,114	48.5	50,953
ECM 7	Install High Efficiency Air Conditioning Units	No	50,599	22.5	0	\$5,717	\$290,766	\$13,652	\$277,114	48.5	50,953
Gas Heating (HVAC/Process) Replacement			0	0.0	379	\$2,515	\$200,378	\$5,600	\$194,778	77.4	44,352
ECM 8	Install High Efficiency Furnaces	No	0	0.0	379	\$2,515	\$200,378	\$5,600	\$194,778	77.4	44,352
HVAC System Improvements			0	0.0	2	\$11	\$14	\$4	\$10	1.0	186
ECM 9	Install Pipe Insulation	Yes	0	0.0	2	\$11	\$14	\$4	\$10	1.0	186
Domestic Water Heating Upgrade			0	0.0	9	\$63	\$72	\$40	\$32	0.5	1,111
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	9	\$63	\$72	\$40	\$32	0.5	1,111
Food Service & Refrigeration Measures			7,977	0.8	0	\$901	\$6,768	\$370	\$6,398	7.1	8,033
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	787	0.1	0	\$89	\$910	\$120	\$790	8.9	792
ECM 12	Refrigeration Controls	No	1,221	0.0	0	\$138	\$3,348	\$150	\$3,198	23.2	1,230
ECM 13	Replace Refrigeration Equipment	Yes	3,551	0.4	0	\$401	\$2,050	\$0	\$2,050	5.1	3,576
ECM 14	Vending Machine Control	Yes	2,418	0.3	0	\$273	\$460	\$100	\$360	1.3	2,435
Custom Measures			28,696	0.0	116	\$4,013	\$99,048	\$0	\$99,048	24.7	42,485
ECM 15	Upgrade/Replace Energy Management System	No	28,696	0.0	116	\$4,013	\$99,048	\$0	\$99,048	24.7	42,485
TOTALS (COST EFFECTIVE MEASURES)			267,194	54.9	111	\$30,928	\$167,935	\$19,861	\$148,074	4.8	282,096
TOTALS (ALL MEASURES)			347,711	77.5	606	\$43,311	\$761,476	\$39,263	\$722,213	16.7	421,115

HEALTH PROFESSIONS BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			68,499	14.3	-14	\$7,623	\$48,465	\$6,796	\$41,669	5.5	67,304
ECM 1	Retrofit Fixtures with LED Lamps	Yes	68,499	14.3	-14	\$7,623	\$48,465	\$6,796	\$41,669	5.5	67,304
Lighting Control Measures			18,474	1.4	-4	\$2,056	\$10,395	\$7,210	\$3,185	1.5	18,151
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	605	0.1	0	\$67	\$270	\$0	\$270	4.0	594
ECM 3	Install High/Low Lighting Controls	Yes	17,869	1.3	-4	\$1,989	\$10,125	\$7,210	\$2,915	1.5	17,557
TOTALS (COST EFFECTIVE MEASURES)			86,973	15.7	-18	\$9,679	\$58,860	\$14,006	\$44,854	4.6	85,454
TOTALS (ALL MEASURES)			86,973	15.7	-18	\$9,679	\$58,860	\$14,006	\$44,854	4.6	85,454

ENERGY EFFICIENT BEST PRACTICES

- Reduce Air Leakage
- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Use Window Treatments/Coverings
- Clean and/or Replace HVAC filters
- Check and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Plug Load Controls
- Water Conservation

See individual reports for specific EE practices by building



CLEAN ENERGY PROGRAM PORTFOLIO

ELIGIBLE SECTORS →

Commercial, Industrial, Government, Non-Profit, Institutional and Multifamily

INCENTIVE PROGRAMS →

Equipment Rebates:

- **SmartStart**
- **Customer Tailored Energy Efficiency Pilot (CTEEP)**
- Direct Install
- Large Energy Users

Whole Buildings:

- **Pay for Performance**

Energy Generation:

- **Combined Heat and Power**

OTHER PROGRAMS →

Renewable Energy Generation:

- **SREC Registration Program (SRP)**
- **Community Solar**

SOLAR ENERGY GENERATION POTENTIAL

	Pitkin Building	West Hall	Technology Building	Ender Hall	HP Building
<i>Potential:</i>	HIGH	HIGH	HIGH	MEDIUM	HIGH
<i>System Potential: (kW)</i>	1,506	129	150	200	150
<i>Electric Generation: (kWh per year)</i>	1,794,203	153,687	178,705	150,489	178,705
<i>Displaced Cost: (per year)</i>	\$3,915,600	\$17,360	\$20,190	\$17,000	\$25,190

SREC Registration Program (SRP):

<http://www.NJCleanEnergy.com/SREC>

Community Solar Energy Pilot Program:

<http://www.NJCleanEnergy.com/CommunitySolar>

COMBINED HEAT & POWER POTENTIAL

	Pitkin Building
<i>Potential:</i>	HIGH
<i>System Type:</i>	Microturbine
<i>System Potential: (kW)</i>	130
<i>Electric Generation: (kWh per year)</i>	1,019,500
<i>Thermal Generation: (MBtu per year)</i>	5,654,555
<i>Displaced Cost: (per year)</i>	\$78,827

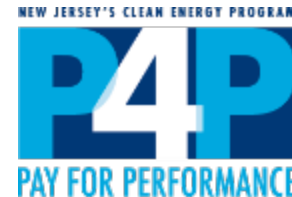


RECOMMENDED NJCEP INCENTIVES PER BUILDING

Entity Name	Pay For Performance	SmartStart	CTEEP	Combined Heat & Power
Pitkin Building	X	X	X	X
West Hall	X	X	X	
Technology Building	X	X	X	
Ender Hall	X	X	X	
Health Professions Building	X	X	X	

PAY FOR PERFORMANCE

NJCleanEnergy.com/P4P



What is P4P: Comprehensive, whole-building approach to saving energy in existing or new facilities.

Qualifications: Annual peak demand 200 kW+ in the previous year for existing buildings

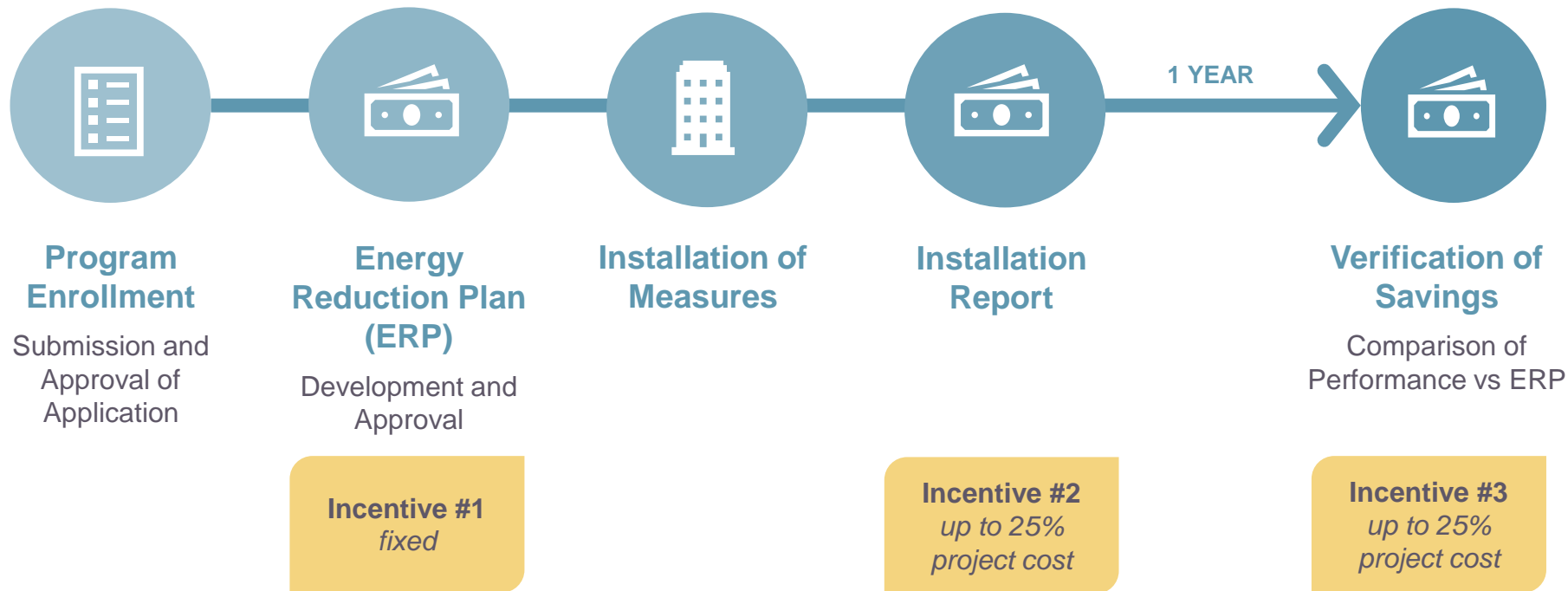
About: Customer choose from a network of pre-approved *Participating Partners*

Incentives:

- Incentives paid in *three* installments
 - Up to \$2MM per project((\$4MM entity cap/year)
 - \$1 million for electric measures
 - \$1 million for gas measures
 - Up to 50% of project cost (or **80%** for UEZ/OZ/Local Govt./K-12 Public Schools)

PAY FOR PERFORMANCE

NJCleanEnergy.com/P4P



DIRECT INSTALL

NJCleanEnergy.com/DI



What is DI: Turn-key retrofit program to replace outdated and inefficient equipment, including lighting, HVAC, refrigeration, etc.

Qualifications: Average electric peak demand <200 kW in the previous 12 months

- About:**
- Pre-approved participating contractors provide support and process paperwork
 - Incentives paid directly to the contractor
 - Fast project turnaround time (4-6 months)

- Incentives:**
- \$125,000 incentive funding per project/building ([\\$250K](#) UEZ/OZ/[Local Govt.](#)/K-12 Public Schools), or
 - \$250,000 entity cap ([\\$4MM](#) UEZ/OZ/[Local Govt.](#)/K-12 Public Schools)

SMARTSTART

NJCleanEnergy.com/SSB

What is SSB: Individual high efficiency equipment rebates for new construction, renovation, remodeling, equipment replacement

Qualifications:

- All C&I customer types contributing into the Societal Benefits Charge (SBC)

About:

- Prescriptive and custom designed measures
- Pre-approval required only for lighting projects with incentives >\$100,000 and all custom projects
- For measures not requiring pre-approval, applications must be submitted to the program within one year of purchase.

Incentives:

- Prescriptive: \$500,000 cap for each electric or gas account
- Custom, lesser of the following:
 - \$0.16/kWh and/or \$1.60/Therm saved annually
 - 50% of incremental installed cost
 - Buy-down to 1 year payback based on incremental cost and savings



SMARTSTART

NJCleanEnergy.com/SSB

Prescriptive Incentives

- Lighting & Lighting Controls
- Packaged HVAC
- Boilers & Water Heaters
- Chillers
- VFD's
- Food Service
- Refrigeration

Prescriptive Only:

**DOUBLE
INCENTIVES FOR
OZ/UEZ/ LOCAL
GOVT./K-12 PUBLIC
SCHOOLS**

Custom Incentives

- New or innovative technologies proven to be cost-effective and not listed as prescriptive
- Projects must have a minimum first year energy savings of 75,000 kWh or 1,500 therms
- Project pre and post inspection required



CUSTOMER TAILORED ENERGY EFFICIENCY PILOT

NJCleanEnergy.com/CTEEP

What is CTEEP: A streamlined/single application process for participants submitting multiple different technology types.

Qualifications:

- All C&I customer types contributing into the Societal Benefits Charge (SBC)

About:

- On site assistance available
- Additional technical incentive available to offset soft costs associated with developing and planning custom projects

Incentives:

- \$250,000 fiscal year entity cap
- Technical assistance incentives for custom project evaluation (up to \$10K)

**SAME INCENTIVE
VALUES AS
SMARTSTART**

COMBINED HEAT & POWER

NJCleanEnergy.com/CHP

What is CHP: Combined Heat & Power (CHP) units generates electricity and recycle waste heat to provide heating and/or cooling

About:

- Fuel Cells (FC) with or without heat recovery (HR)
- Resiliency with Return on Investment
- Technology-neutral incentives

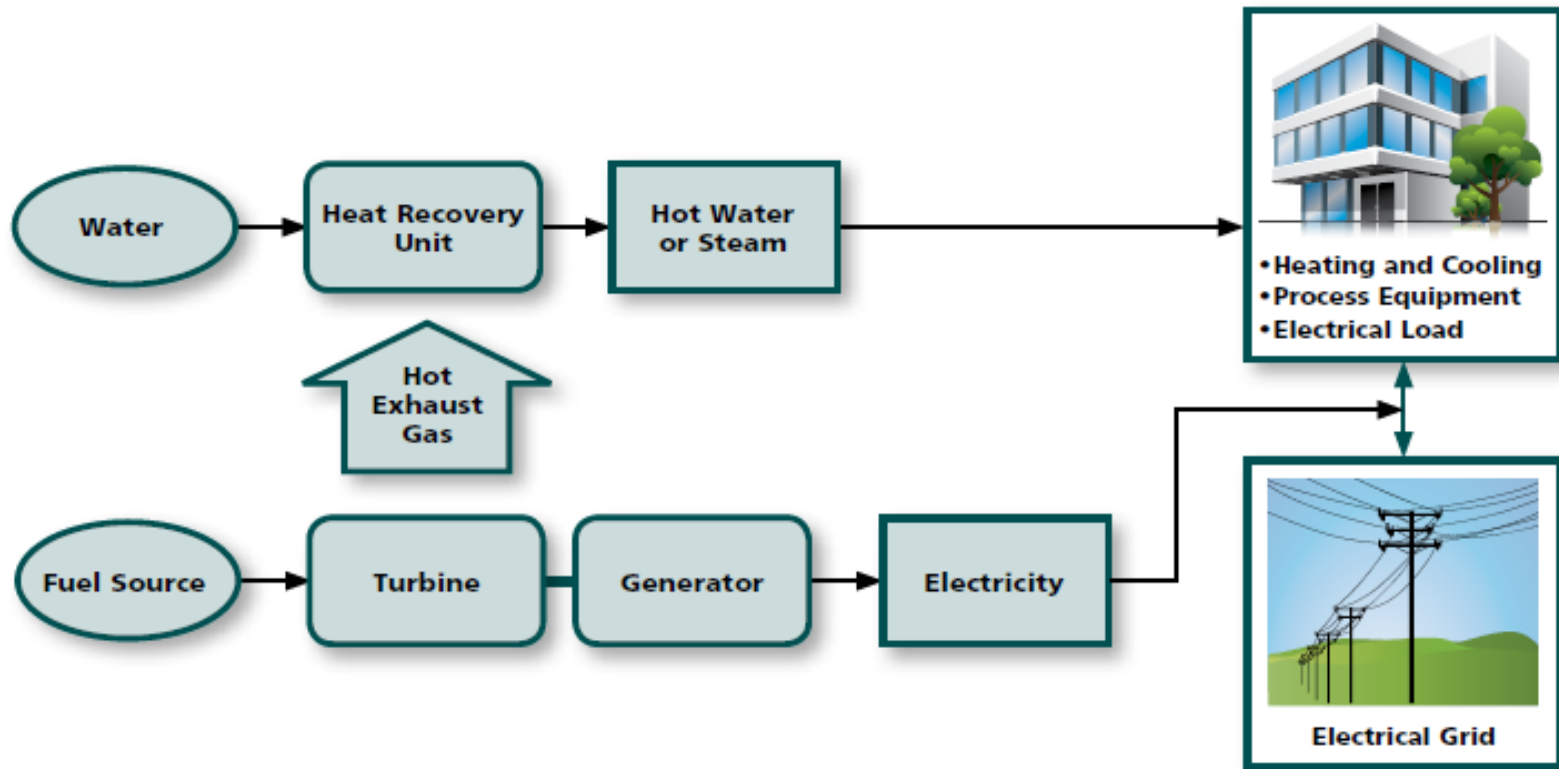
Incentives:

- 30/50/20 Incentive payment
 - 30% when equipment purchased
 - 50% when system installed
 - 20% upon confirmation that the project is achieving the required performance



COMBINED HEAT & POWER

NJCleanEnergy.com/CHP



COMBINED HEAT & POWER

NJCleanEnergy.com/CHP

Eligible Technology	Size (Installed Rated Capacity)	Incentive (\$/Watt) ⁽⁵⁾	% of Total Cost Cap per project	\$ Cap per project	
CHP powered by non-renewable or renewable fuel source, or a combination ⁽⁴⁾ : <ul style="list-style-type: none"> • Gas Internal Combustion Engine • Gas Combustion Turbine • Microturbine 	≤500 kW ⁽¹⁾	\$2.00	30-40% ⁽²⁾	\$2 million	
	>500 kW – 1 MW ⁽¹⁾	\$1.00			
	Fuel Cell with Heat Recovery (FCHR)	>1 MW – 3 MW ⁽¹⁾	\$0.55	30%	\$3 million
		>3 MW ⁽¹⁾	\$0.35		
Fuel Cell without Heat Recovery (FCwoHR)	Same as above ⁽¹⁾	Applicable amount above	30%	\$1 million	
Waste Heat to Power (WHP) ⁽³⁾ Powered by non-renewable fuel source. Heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine)	≤1 MW ⁽¹⁾	\$1.00	30%	\$2 million	
	>1 MW ⁽¹⁾	\$0.50	30%	\$3 million	

Critical Facility/Blackstart bonus of 25%



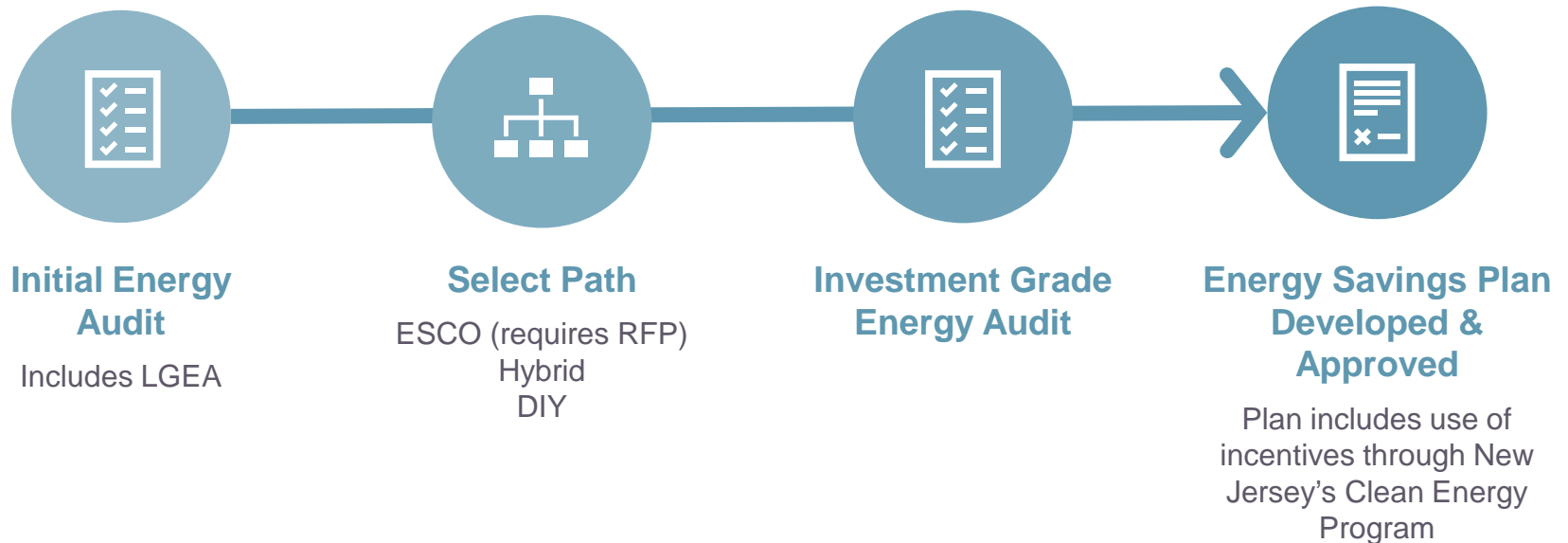
FINANCING MECHANISM: ESIP

ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

- Provides alternative financing for energy savings projects at public institutions
- Administered directly by the BPU
- Value of energy savings leveraged to pay for cost of EE projects over a 15 year contract
- Requires NO new bonding and is outside of capital budget
- Does not count as debt or require voter approval



FINANCING MECHANISM: ESIP



ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

FOR MORE INFORMATION

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New Jersey's
cleanenergy
program™

FOR MORE INFORMATION

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QUESTIONS

