

New Jersey's Clean Energy Program

LG&A Exit Meeting for:
Stockton University

TRC Energy Services

April 30, 2019

Introductions

Stockton University

- Charles West – Director, Facilities Planning and Construction
- John Fritsch – Director, Facilities Management & Plant Operations
- Alice Gitchell – Energy Specialist
- Mike Ferraro – Specialist
- Matt Gettings – HVAC Shop Supervisor
- Albin Montag – Electrical Shop Supervisor

Introductions



NJ Clean Energy Program

- Brian DeLuca, CEM – TRC Program Manager
- Vish Nimbalkar, PE – TRC Lead Auditor
- Elizabeth Ebinger – TRC Account Manager
- Gary Finger – TRC Outreach Manager
- Arif Welcher – BPU Ombudsman
- Mike Thulen – ESIP Coordinator

Agenda

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

LGEA Process



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

Site Visit and Utility Analysis

Overview of Systems, Baseline & Existing Conditions:

- Building Envelope
- Lighting System
- HVAC and Mechanical Systems
- Plug Load Equipment
- GSHP/ ATES

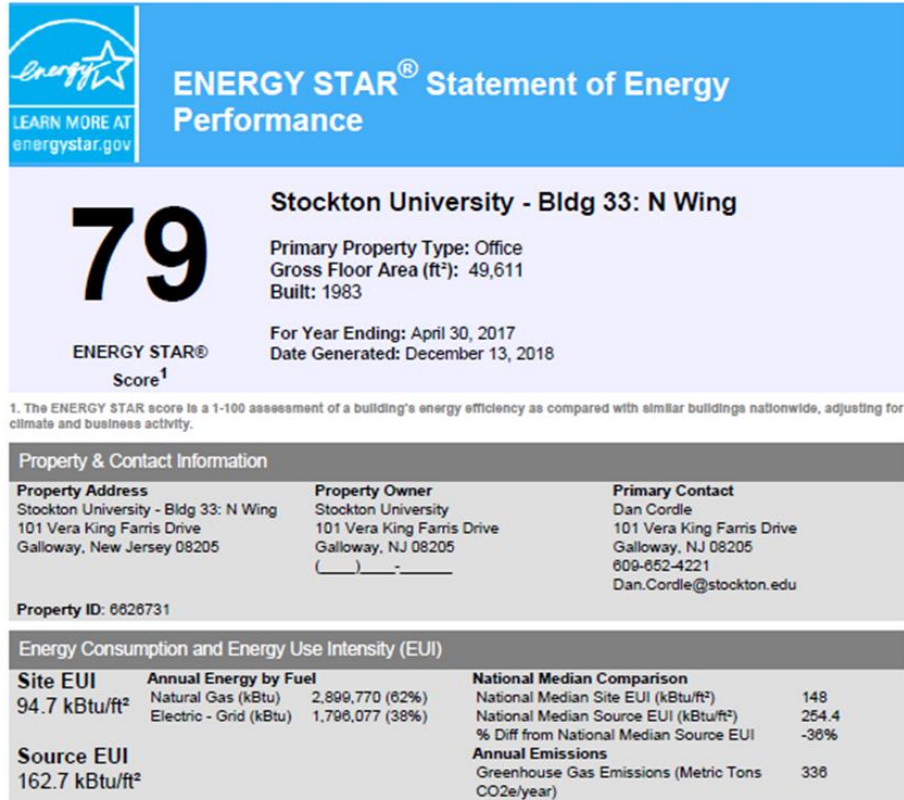
Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs
- Prorating of Campus Meter

Sites Visited/Analyzed

- ATES Geothermal Manifold House #25
- Arts & Sciences #29
- A-D Wings #30
- E-H Wings #31
- I-M Wings #32 & West Quad #34
- N Wing #33
- Auxiliary Fire Pump #35
- TRLC #36
- Housing 3 L-P Dorms #37
- Housing 2 A-K Dorms & Support #39
- Multipurpose Rec. Center #41 & #42
- Water Plant, Storage, & Salt
- College Center #50
- Unified Science Center #51

Benchmarking



ENERGY STAR Scores are percentile ranking from 1 (least efficient) to 100 (most efficient). It compares your building's energy performance to similar buildings nationwide.

Building Name	ENERGY STAR Score
ATES Geothermal Manifold House #25	N/A
Arts & Sciences #29	N/A
A-D Wings #30	N/A
E-H Wings #31	N/A
I-M Wings #32, West Quad #34	N/A
N Wing #33	79
Auxiliary Fire Pump #35	N/A
TRLC #36	N/A
Housing 3 L-P Dorms #37	60
Housing 2 A-K Dorms #38 & Support #39	66
Multipurpose Rec. Center #41 & #42	N/A
Water Plant, Storage Salt	N/A
College Center #50	N/A
Unified Science Center #51	N/A

All Opportunities (Part 1)



Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	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	2,937,642	506.4	0.0	0.0	\$352,809	\$1,155,138	\$184,920	\$970,218	2.7	2,958,182
Install LED Fixtures	799,806	135.0	0.0	0.0	\$96,056	\$531,487	\$42,100	\$489,387	5.1	805,398
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	51,371	8.3	0.0	0.0	\$6,170	\$17,458	\$1,925	\$15,533	2.5	51,731
Retrofit Fixtures with LED Lamps	2,083,574	362.9	0.0	0.0	\$250,236	\$603,804	\$140,895	\$462,909	1.8	2,098,142
Install LED Exit Signs	2,891	0.2	0.0	0.0	\$347	\$2,390	\$0	\$2,390	6.9	2,911
Lighting Control Measures	370,416	52.9	0.0	0.0	\$44,487	\$384,530	\$36,785	\$347,745	7.8	373,006
Install Occupancy Sensor Lighting Controls	288,249	42.3	0.0	0.0	\$34,619	\$280,530	\$36,085	\$244,445	7.1	290,265
Install High/Low Lighting Controls	82,167	10.5	0.0	0.0	\$9,868	\$104,000	\$700	\$103,300	10.5	82,741
Motor Upgrades	54,030	11.3	0.0	0.0	\$6,489	\$147,634	\$0	\$147,634	22.8	54,408
Premium Efficiency Motors	54,030	11.3	0.0	0.0	\$6,489	\$147,634	\$0	\$147,634	22.8	54,408
Variable Frequency Drive (VFD) Measures	756,770	148.2	0.0	0.0	\$90,887	\$406,435	\$68,285	\$338,150	3.7	762,061
Install VFD on Variable Air Volume (VAV) HVAC	113,029	32.1	0.0	0.0	\$13,573	\$53,769	\$15,725	\$38,044	2.8	113,819
Install VFDs on Constant Volume (CV) HVAC	436,024	103.5	0.0	0.0	\$52,366	\$278,627	\$48,360	\$230,267	4.4	439,073
Install VFDs on Chilled Water Pumps	77,549	10.0	0.0	0.0	\$9,314	\$40,019	\$0	\$40,019	4.3	78,091
Install VFDs on Hot Water Pumps	38,066	2.6	0.0	0.0	\$4,572	\$13,229	\$0	\$13,229	2.9	38,332
Install VFDs on Cooling Tower Fans	92,102	0.0	0.0	0.0	\$11,061	\$20,790	\$4,200	\$16,590	1.5	92,746
Electric Unitary HVAC Measures	166,193	101.3	0.0	0.0	\$19,960	\$574,072	\$14,933	\$559,139	28.0	167,355
Install High Efficiency Electric AC	15,032	5.6	0.0	0.0	\$1,805	\$265,917	\$0	\$265,917	147.3	15,137
Install High Efficiency Heat Pumps	151,162	95.7	0.0	0.0	\$18,155	\$308,155	\$14,933	\$293,222	16.2	152,218

All Opportunities (Part 2)



Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	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 Chiller Replacement	323,116	101.5	0.0	0.0	\$38,806	\$425,252	\$25,530	\$399,722	10.3	325,376
Install High Efficiency Chillers	323,116	101.5	0.0	0.0	\$38,806	\$425,252	\$25,530	\$399,722	10.3	325,376
Gas Heating (HVAC/Process) Replacement	0	0.0	1,043.0	1,043.0	\$10,477	\$488,708	\$23,435	\$465,273	44.4	122,120
Install High Efficiency Hot Water Boilers	0	0.0	776.4	776.4	\$7,783	\$424,637	\$19,835	\$404,802	52.0	90,905
Install High Efficiency Furnaces	0	0.0	249.3	249.3	\$2,520	\$57,058	\$3,600	\$53,458	21.2	29,192
Install High Efficiency Unit Heaters	0	0.0	17.3	17.3	\$175	\$7,013	\$0	\$7,013	40.2	2,023
HVAC System Improvements	36,605	0.0	531.2	531.2	\$9,722	\$47,580	\$0	\$47,580	4.9	99,055
Implement Demand Control Ventilation	36,605	0.0	531.2	531.2	\$9,722	\$47,580	\$0	\$47,580	4.9	99,055
Domestic Water Heating Upgrade	0	0.0	374.0	374.0	\$3,780	\$10,829	\$50	\$10,779	2.9	43,790
Install High Efficiency Gas Water Heater	0	0.0	3.0	3.0	\$30	\$2,110	\$50	\$2,060	68.2	350
Install Low-Flow Domestic Hot Water Devices	0	0.0	371.0	371.0	\$3,749	\$8,719	\$0	\$8,719	2.3	43,440
Food Service Equipment & Refrigeration Measures	31,002	2.4	56.2	56.2	\$4,291	\$28,361	\$1,150	\$27,211	6.3	37,796
Dishwasher Replacement	0	0.0	56.2	56.2	\$568	\$4,342	\$400	\$3,942	6.9	6,578
Refrigerator/Freezer Case Electrically Commutated Motors	14,268	1.8	0.0	0.0	\$1,714	\$7,279	\$0	\$7,279	4.2	14,368
Refrigeration Controls	16,734	0.6	0.0	0.0	\$2,010	\$16,740	\$750	\$15,990	8.0	16,851
Plug Load Equipment Control - Vending Machine	24,137	0.0	0.0	0.0	\$2,899	\$5,980	\$0	\$5,980	2.1	24,306
Vending Machine Control	24,137	0.0	0.0	0.0	\$2,899	\$5,980	\$0	\$5,980	2.1	24,306
Custom Measures	80,000	0.0	88.0	88.0	\$10,471	\$145,000	\$0	\$145,000	13.8	90,863
Install Integrated Controls for Lighting & HVAC (DOE ISOP)	80,000	0.0	88.0	88.0	\$10,471	\$145,000	\$0	\$145,000	13.8	90,863
TOTALS	4,779,911	924.0	2,092.3	2,092.3	\$595,077	\$3,819,518	\$355,088	\$3,464,430	5.8	5,058,318

Cost Effective Opportunities*

* Opportunities considered cost effective have a payback period less than 2/3rds of the useful life of the measure



Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	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		2,937,629	506.4	0.0	0.0	\$352,808	\$1,155,073	\$184,910	\$970,163	2.7	2,958,169
ECM 1	Install LED Fixtures	799,806	135.0	0.0	0.0	\$96,056	\$531,487	\$42,100	\$489,387	5.1	805,398
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	51,358	8.2	0.0	0.0	\$6,168	\$17,393	\$1,915	\$15,478	2.5	51,717
ECM 3	Retrofit Fixtures with LED Lamps	2,083,574	362.9	0.0	0.0	\$250,236	\$603,804	\$140,895	\$462,909	1.8	2,098,142
ECM 4	Install LED Exit Signs	2,891	0.2	0.0	0.0	\$347	\$2,390	\$0	\$2,390	6.9	2,911
Lighting Control Measures		356,238	49.2	0.0	0.0	\$42,784	\$341,870	\$31,290	\$310,580	7.3	358,728
ECM 5	Install Occupancy Sensor Lighting Controls	274,071	38.7	0.0	0.0	\$32,916	\$237,870	\$30,590	\$207,280	6.3	275,987
ECM 6	Install High/Low Lighting Controls	82,167	10.5	0.0	0.0	\$9,868	\$104,000	\$700	\$103,300	10.5	82,741
Motor Upgrades		42,533	8.9	0.0	0.0	\$5,108	\$111,549	\$0	\$111,549	21.8	42,831
ECM 7	Premium Efficiency Motors	42,533	8.9	0.0	0.0	\$5,108	\$111,549	\$0	\$111,549	21.8	42,831
Variable Frequency Drive (VFD) Measures		735,719	141.6	0.0	0.0	\$88,358	\$371,142	\$64,325	\$306,817	3.5	740,864
ECM 8	Install VFD on Variable Air Volume (VAV) HVAC	113,029	32.1	0.0	0.0	\$13,573	\$53,769	\$15,725	\$38,044	2.8	113,819
ECM 9	Install VFDs on Constant Volume (CV) HVAC	414,974	96.9	0.0	0.0	\$49,838	\$243,335	\$44,400	\$198,935	4.0	417,875
ECM 10	Install VFDs on Chilled Water Pumps	77,549	10.0	0.0	0.0	\$9,314	\$40,019	\$0	\$40,019	4.3	78,091
ECM 11	Install VFDs on Hot Water Pumps	38,066	2.6	0.0	0.0	\$4,572	\$13,229	\$0	\$13,229	2.9	38,332
ECM 12	Install VFDs on Cooling Tower Fans	92,102	0.0	0.0	0.0	\$11,061	\$20,790	\$4,200	\$16,590	1.5	92,746
Electric Chiller Replacement		323,116	101.5	0.0	0.0	\$38,806	\$425,252	\$25,530	\$399,722	10.3	325,376
ECM 13	Install High Efficiency Chillers	323,116	101.5	0.0	0.0	\$38,806	\$425,252	\$25,530	\$399,722	10.3	325,376
HVAC System Improvements		36,605	0.0	531.2	531.2	\$9,722	\$47,580	\$0	\$47,580	4.9	99,055
ECM 14	Implement Demand Control Ventilation	36,605	0.0	531.2	531.2	\$9,722	\$47,580	\$0	\$47,580	4.9	99,055
Domestic Water Heating Upgrade		0	0.0	371.0	371.0	\$3,749	\$8,719	\$0	\$8,719	2.3	43,440
ECM 15	Install Low-Flow Domestic Hot Water Devices	0	0.0	371.0	371.0	\$3,749	\$8,719	\$0	\$8,719	2.3	43,440
Food Service Equipment & Refrigeration Measures		31,002	2.4	56.2	56.2	\$4,291	\$28,361	\$1,150	\$27,211	6.3	37,796
ECM 16	Dishwasher Replacement	0	0.0	56.2	56.2	\$568	\$4,342	\$400	\$3,942	6.9	6,578
ECM 17	Refrigerator/Freezer Case Electrically Commutated Motors	14,268	1.8	0.0	0.0	\$1,714	\$7,279	\$0	\$7,279	4.2	14,368
ECM 18	Refrigeration Controls	16,734	0.6	0.0	0.0	\$2,010	\$16,740	\$750	\$15,990	8.0	16,851
Plug Load Equipment Control - Vending Machine		24,137	0.0	0.0	0.0	\$2,899	\$5,980	\$0	\$5,980	2.1	24,306
ECM 19	Vending Machine Control	24,137	0.0	0.0	0.0	\$2,899	\$5,980	\$0	\$5,980	2.1	24,306
Custom Measures		80,000	0.0	88.0	88.0	\$10,471	\$145,000	\$0	\$145,000	13.8	90,863
ECM 20	<Enter Custom Measure Name>	80,000	0.0	88.0	88.0	\$10,471	\$145,000	\$0	\$145,000	13.8	90,863
TOTALS		4,566,979	810.0	1,046.4	1,046.4	\$558,997	\$2,640,527	\$307,205	\$2,333,322	4.2	4,721,427

ATES Manifold House #25



Energy Conservation Measure		Recommend?	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			317,345	46.0	0.0	\$38,113.16	\$128,400.00	\$17,540.00	\$110,860.00	2.9	319,564
ECM 1	Install LED Fixtures	Yes	274,819	40.3	0.0	\$33,005.73	\$122,800.00	\$17,260.00	\$105,540.00	3.2	276,740
ECM 2	Retrofit Fixtures with LED Lamps	Yes	42,526	5.7	0.0	\$5,107.42	\$5,600.00	\$280.00	\$5,320.00	1.0	42,824
TOTALS FOR HIGH PRIORITY MEASURES			317,345	46.0	0.0	\$38,113.16	\$128,400.00	\$17,540.00	\$110,860.00	2.9	319,564
TOTALS FOR ALL EVALUATED MEASURES			317,345	46.0	0.0	\$38,113.16	\$128,400.00	\$17,540.00	\$110,860.00	2.9	319,564

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Arts & Science #29



Energy Conservation Measure		Recommend?	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			88,862	13.4	0.0	\$10,672.33	\$41,682.47	\$7,130.00	\$34,552.47	3.2	89,483
ECM 1	Install LED Fixtures	Yes	17,185	2.5	0.0	\$2,063.91	\$17,751.52	\$1,150.00	\$16,601.52	8.0	17,305
	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	13	0.0	0.0	\$1.59	\$64.77	\$10.00	\$54.77	34.5	13
ECM 2	Retrofit Fixtures with LED Lamps	Yes	68,773	10.6	0.0	\$8,259.65	\$21,476.47	\$5,970.00	\$15,506.47	1.9	69,254
ECM 3	Install LED Exit Signs	Yes	2,891	0.2	0.0	\$347.19	\$2,389.71	\$0.00	\$2,389.71	6.9	2,911
Lighting Control Measures			17,654	2.6	0.0	\$2,120.20	\$19,560.00	\$1,680.00	\$17,880.00	8.4	17,777
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	12,460	1.9	0.0	\$1,496.43	\$12,960.00	\$1,680.00	\$11,280.00	7.5	12,547
ECM 5	Install High/Low Lighting Controls	Yes	5,194	0.8	0.0	\$623.78	\$6,600.00	\$0.00	\$6,600.00	10.6	5,230
Plug Load Equipment Control - Vending Machine			3,224	0.0	0.0	\$387.16	\$460.00	\$0.00	\$460.00	1.2	3,246
ECM 6	Vending Machine Control	Yes	3,224	0.0	0.0	\$387.16	\$460.00	\$0.00	\$460.00	1.2	3,246
TOTALS FOR HIGH PRIORITY MEASURES			109,726	16.0	0.0	\$13,178.12	\$61,637.70	\$8,800.00	\$52,837.70	4.0	110,493
TOTALS FOR ALL EVALUATED MEASURES			109,739	16.0	0.0	\$13,179.70	\$61,702.47	\$8,810.00	\$52,892.47	4.0	110,507

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

A-D Wings #30



Energy Conservation Measure		Recommend?	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			137,583	33.5	0.0	\$16,522.02	\$90,126.47	\$10,005.00	\$80,121.47	4.8	138,545
ECM 1	Install LED Fixtures	Yes	21,654	5.6	0.0	\$2,600.42	\$12,000.00	\$40.00	\$11,960.00	4.6	21,806
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	4,155	1.1	0.0	\$498.95	\$2,473.00	\$245.00	\$2,228.00	4.5	4,184
ECM 3	Retrofit Fixtures with LED Lamps	Yes	111,773	26.9	0.0	\$13,422.65	\$75,653.47	\$9,720.00	\$65,933.47	4.9	112,555
Lighting Control Measures			15,177	3.9	0.0	\$1,822.60	\$43,460.00	\$6,195.00	\$37,265.00	20.4	15,283
	Install Occupancy Sensor Lighting Controls	No	14,178	3.6	0.0	\$1,702.65	\$42,660.00	\$5,495.00	\$37,165.00	21.8	14,277
ECM 4	Install High/Low Lighting Controls	Yes	999	0.3	0.0	\$119.96	\$800.00	\$700.00	\$100.00	0.8	1,006
Motor Upgrades			5,521	1.2	0.0	\$662.98	\$20,671.08	\$0.00	\$20,671.08	31.2	5,559
	Premium Efficiency Motors	No	5,521	1.2	0.0	\$662.98	\$20,671.08	\$0.00	\$20,671.08	31.2	5,559
Variable Frequency Drive (VFD) Measures			119,000	32.8	0.0	\$14,290.53	\$59,784.35	\$15,725.00	\$44,059.35	3.1	119,832
ECM 5	Install VFD on Variable Air Volume (VAV) HVAC	Yes	113,029	32.1	0.0	\$13,573.39	\$53,769.05	\$15,725.00	\$38,044.05	2.8	113,819
ECM 6	Install VFDs on Hot Water Pumps	Yes	5,972	0.8	0.0	\$717.13	\$6,015.30	\$0.00	\$6,015.30	8.4	6,013
Gas Heating (HVAC/Process) Replacement			0	0.0	214.2	\$2,101.45	\$59,766.91	\$5,022.00	\$54,744.91	26.1	25,077
	Install High Efficiency Hot Water Boilers	No	0	0.0	214.2	\$2,101.45	\$59,766.91	\$5,022.00	\$54,744.91	26.1	25,077
HVAC System Improvements			5,446	0.0	141.9	\$2,046.21	\$20,391.30	\$0.00	\$20,391.30	10.0	22,097
ECM 7	Implement Demand Control Ventilation	Yes	5,446	0.0	141.9	\$2,046.21	\$20,391.30	\$0.00	\$20,391.30	10.0	22,097
Plug Load Equipment Control - Vending Machine			9,671	0.0	0.0	\$1,161.38	\$1,380.00	\$0.00	\$1,380.00	1.2	9,739
ECM 8	Vending Machine Control	Yes	9,671	0.0	0.0	\$1,161.38	\$1,380.00	\$0.00	\$1,380.00	1.2	9,739
Custom Measures			80,000	0.0	88.0	\$10,470.50	\$145,000.00	\$0.00	\$145,000.00	13.8	90,863
ECM 9	Install Integrated Controls for Lighting and HVAC (DOE ISOP)	Yes	80,000	0.0	88.0	\$10,470.50	\$145,000.00	\$0.00	\$145,000.00	13.8	90,863
TOTALS FOR HIGH PRIORITY MEASURES			352,699	66.6	229.9	\$44,610.59	\$317,482.13	\$26,430.00	\$291,052.13	6.5	382,082
TOTALS FOR ALL EVALUATED MEASURES			372,398	71.5	444.1	\$49,077.66	\$440,580.12	\$36,947.00	\$403,633.12	8.2	426,996

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

E-H Wings #31



Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	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			644,059	92.6	0.0	0.0	\$77,351	\$209,646	\$47,830	\$161,816	2.1	648,562
ECM 1	Install LED Fixtures	Yes	43,083	6.3	0.0	0.0	\$5,174	\$40,086	\$3,900	\$36,186	7.0	43,385
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	30,100	4.0	0.0	0.0	\$3,615	\$8,019	\$975	\$7,044	1.9	30,311
ECM 3	Retrofit Fixtures with LED Lamps	Yes	570,875	82.3	0.0	0.0	\$68,562	\$161,541	\$42,955	\$118,586	1.7	574,867
Lighting Control Measures			109,366	13.9	0.0	0.0	\$13,135	\$94,200	\$9,100	\$85,100	6.5	110,130
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	86,608	11.1	0.0	0.0	\$10,402	\$70,200	\$9,100	\$61,100	5.9	87,213
ECM 5	Install High/Low Lighting Controls	Yes	22,758	2.9	0.0	0.0	\$2,733	\$24,000	\$0	\$24,000	8.8	22,917
Motor Upgrades			14,121	2.7	0.0	0.0	\$1,696	\$36,415	\$0	\$36,415	21.5	14,220
ECM 6	Premium Efficiency Motors	Yes	14,121	2.7	0.0	0.0	\$1,696	\$36,415	\$0	\$36,415	21.5	14,220
Variable Frequency Drive (VFD) Measures			161,442	33.3	0.0	0.0	\$19,389	\$113,031	\$19,000	\$94,031	4.8	162,571
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	129,348	31.5	0.0	0.0	\$15,535	\$105,817	\$19,000	\$86,817	5.6	130,252
ECM 8	Install VFDs on Hot Water Pumps	Yes	32,094	1.9	0.0	0.0	\$3,855	\$7,214	\$0	\$7,214	1.9	32,319
Domestic Water Heating Upgrade			0	0.0	63.4	63.4	\$641	\$222	\$0	\$222	0.3	7,429
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	63.4	63.4	\$641	\$222	\$0	\$222	0.3	7,429
Plug Load Equipment Control - Vending Machine			3,224	0.0	0.0	0.0	\$387	\$460	\$0	\$460	1.2	3,246
ECM 10	Vending Machine Control	Yes	3,224	0.0	0.0	0.0	\$387	\$460	\$0	\$460	1.2	3,246
TOTALS FOR HIGH PRIORITY MEASURES			932,211	142.6	63.4	63.4	\$112,600	\$453,973	\$75,930	\$378,043	3.4	946,158
TOTALS FOR ALL EVALUATED MEASURES			932,211	142.6	63.4	63.4	\$112,600	\$453,973	\$75,930	\$378,043	3.4	946,158

I-M Wings #32 & West Quad #34



Energy Conservation Measure		Recommend?	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			507,949	126.3	0.0	\$61,004.70	\$170,123.22	\$34,300.00	\$135,823.22	2.2	511,501
ECM 1	Install LED Fixtures	Yes	48,004	8.0	0.0	\$5,765.28	\$44,605.81	\$4,530.00	\$40,075.81	7.0	48,340
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	5,306	1.2	0.0	\$637.27	\$2,131.95	\$310.00	\$1,821.95	2.9	5,343
ECM 3	Retrofit Fixtures with LED Lamps	Yes	454,639	117.1	0.0	\$54,602.15	\$123,385.46	\$29,460.00	\$93,925.46	1.7	457,818
Lighting Control Measures			72,463	12.6	0.0	\$8,702.77	\$87,810.00	\$8,435.00	\$79,375.00	9.1	72,969
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	57,991	10.2	0.0	\$6,964.72	\$65,610.00	\$8,435.00	\$57,175.00	8.2	58,396
ECM 5	Install High/Low Lighting Controls	Yes	14,472	2.4	0.0	\$1,738.05	\$22,200.00	\$0.00	\$22,200.00	12.8	14,573
Motor Upgrades			15,563	3.6	0.0	\$1,869.06	\$35,988.88	\$0.00	\$35,988.88	19.3	15,671
ECM 6	Premium Efficiency Motors	Yes	15,563	3.6	0.0	\$1,869.06	\$35,988.88	\$0.00	\$35,988.88	19.3	15,671
Variable Frequency Drive (VFD) Measures			107,874	19.6	0.0	\$12,955.63	\$90,662.96	\$13,600.00	\$77,062.96	5.9	108,628
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	71,873	19.6	0.0	\$8,631.98	\$79,239.11	\$11,800.00	\$67,439.11	7.8	72,376
ECM 8	Install VFDs on Cooling Tower Fans	Yes	36,000	0.0	0.0	\$4,323.65	\$11,423.85	\$1,800.00	\$9,623.85	2.2	36,252
Electric Unitary HVAC Measures			15,032	5.6	0.0	\$1,805.29	\$265,916.60	\$0.00	\$265,916.60	147.3	15,137
	Install High Efficiency Electric AC	No	15,032	5.6	0.0	\$1,805.29	\$265,916.60	\$0.00	\$265,916.60	147.3	15,137
Electric Chiller Replacement			138,879	52.1	0.0	\$16,679.36	\$240,127.30	\$14,565.00	\$225,562.30	13.5	139,850
ECM 9	Install High Efficiency Chillers	Yes	138,879	52.1	0.0	\$16,679.36	\$240,127.30	\$14,565.00	\$225,562.30	13.5	139,850
Gas Heating (HVAC/Process) Replacement			0	0.0	301.8	\$3,049.81	\$228,492.19	\$2,400.00	\$226,092.19	74.1	35,335
	Install High Efficiency Hot Water Boilers	No	0	0.0	132.0	\$1,334.41	\$185,198.56	\$0.00	\$185,198.56	138.8	15,461
	Install High Efficiency Furnaces	No	0	0.0	169.7	\$1,715.40	\$43,293.63	\$2,400.00	\$40,893.63	23.8	19,875
HVAC System Improvements			10,458	0.0	137.8	\$2,648.69	\$10,875.36	\$0.00	\$10,875.36	4.1	26,667
ECM 10	Implement Demand Control Ventilation	Yes	10,458	0.0	137.8	\$2,648.69	\$10,875.36	\$0.00	\$10,875.36	4.1	26,667
Domestic Water Heating Upgrade			0	0.0	87.0	\$879.05	\$315.48	\$0.00	\$315.48	0.4	10,185
ECM 11	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	87.0	\$879.05	\$315.48	\$0.00	\$315.48	0.4	10,185
Plug Load Equipment Control - Vending Machine			2,740	0.0	0.0	\$329.09	\$1,840.00	\$0.00	\$1,840.00	5.6	2,759
ECM 12	Vending Machine Control	Yes	2,740	0.0	0.0	\$329.09	\$1,840.00	\$0.00	\$1,840.00	5.6	2,759
TOTALS FOR HIGH PRIORITY MEASURES			855,926	214.3	224.8	\$105,068.35	\$637,743.20	\$70,900.00	\$566,843.20	5.4	888,230
TOTALS FOR ALL EVALUATED MEASURES			870,957	219.9	526.6	\$109,923.44	\$1,132,151.99	\$73,300.00	\$1,058,851.99	9.6	938,702

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

N Wing #33



Energy Conservation Measure		Recommend?	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			60,651	11.3	0.0	\$7,284.19	\$28,820.13	\$4,940.00	\$23,880.13	3.3	61,075
ECM 1	Install LED Fixtures	Yes	12,242	2.0	0.0	\$1,470.25	\$12,694.97	\$1,100.00	\$11,594.97	7.9	12,327
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	380	0.3	0.0	\$45.68	\$457.04	\$0.00	\$457.04	10.0	383
ECM 3	Retrofit Fixtures with LED Lamps	Yes	48,029	9.1	0.0	\$5,768.26	\$15,668.13	\$3,840.00	\$11,828.13	2.1	48,365
Lighting Control Measures			9,349	1.7	0.0	\$1,122.86	\$10,040.00	\$1,120.00	\$8,920.00	7.9	9,415
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	8,451	1.5	0.0	\$1,014.93	\$8,640.00	\$1,120.00	\$7,520.00	7.4	8,510
ECM 5	Install High/Low Lighting Controls	Yes	899	0.2	0.0	\$107.94	\$1,400.00	\$0.00	\$1,400.00	13.0	905
Motor Upgrades			842	0.2	0.0	\$101.15	\$800.37	\$0.00	\$800.37	7.9	848
ECM 6	Premium Efficiency Motors	Yes	842	0.2	0.0	\$101.15	\$800.37	\$0.00	\$800.37	7.9	848
Gas Heating (HVAC/Process) Replacement			0	0.0	156.5	\$1,581.59	\$37,976.58	\$3,419.14	\$34,557.44	21.8	18,325
	Install High Efficiency Hot Water Boilers	No	0	0.0	76.9	\$777.38	\$24,212.25	\$2,219.14	\$21,993.11	28.3	9,007
	Install High Efficiency Furnaces	No	0	0.0	79.6	\$804.21	\$13,764.33	\$1,200.00	\$12,564.33	15.6	9,318
Domestic Water Heating Upgrade			0	0.0	19.1	\$193.04	\$100.38	\$0.00	\$100.38	0.5	2,237
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	19.1	\$193.04	\$100.38	\$0.00	\$100.38	0.5	2,237
Food Service Equipment & Refrigeration Measures			11,859	0.9	0.0	\$1,424.32	\$7,751.70	\$225.00	\$7,526.70	5.3	11,942
ECM 8	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	5,550	0.7	0.0	\$666.56	\$2,729.70	\$0.00	\$2,729.70	4.1	5,589
ECM 9	Refrigeration Controls	Yes	6,309	0.2	0.0	\$757.76	\$5,022.00	\$225.00	\$4,797.00	6.3	6,354
Plug Load Equipment Control - Vending Machine			685	0.0	0.0	\$82.27	\$460.00	\$0.00	\$460.00	5.6	690
ECM 10	Vending Machine Control	Yes	685	0.0	0.0	\$82.27	\$460.00	\$0.00	\$460.00	5.6	690
TOTALS FOR HIGH PRIORITY MEASURES			83,387	14.2	19.1	\$10,207.85	\$47,972.58	\$6,285.00	\$41,687.58	4.1	86,207
TOTALS FOR ALL EVALUATED MEASURES			83,387	14.2	175.6	\$11,789.44	\$85,949.17	\$9,704.14	\$76,245.03	6.5	104,531

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Auxiliary Fire Pump #35



Energy Conservation Measure		Recommend?	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			2,639	0.6	0.0	\$316.93	\$1,878.84	\$350.00	\$1,528.84	4.8	2,657
ECM 1	Install LED Fixtures	Yes	576	0.1	0.0	\$69.23	\$965.97	\$100.00	\$865.97	12.5	580
ECM 2	Retrofit Fixtures with LED Lamps	Yes	2,063	0.5	0.0	\$247.71	\$912.88	\$250.00	\$662.88	2.7	2,077
TOTALS FOR HIGH PRIORITY MEASURES			2,639	0.6	0.0	\$316.93	\$1,878.84	\$350.00	\$1,528.84	4.8	2,657
TOTALS FOR ALL EVALUATED MEASURES			2,639	0.6	0.0	\$316.93	\$1,878.84	\$350.00	\$1,528.84	4.8	2,657

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

TRLC #36



Energy Conservation Measure		Recommend?	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			9,374	1.7	0.0	\$1,125.80	\$4,845.45	\$970.00	\$3,875.45	3.4	9,439
ECM 1	Install LED Fixtures	Yes	1,809	0.3	0.0	\$217.25	\$1,931.93	\$200.00	\$1,731.93	8.0	1,822
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	215	0.0	0.0	\$25.79	\$68.77	\$10.00	\$58.77	2.3	216
ECM 3	Retrofit Fixtures with LED Lamps	Yes	7,350	1.4	0.0	\$882.75	\$2,844.75	\$760.00	\$2,084.75	2.4	7,402
Lighting Control Measures			2,589	0.5	0.0	\$310.92	\$3,160.00	\$280.00	\$2,880.00	9.3	2,607
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	2,142	0.4	0.0	\$257.22	\$2,160.00	\$280.00	\$1,880.00	7.3	2,157
ECM 5	Install High/Low Lighting Controls	Yes	447	0.1	0.0	\$53.69	\$1,000.00	\$0.00	\$1,000.00	18.6	450
Electric Unitary HVAC Measures			5,354	3.0	0.0	\$642.99	\$24,377.00	\$1,326.33	\$23,050.66	35.8	5,391
	Install High Efficiency Heat Pumps	No	5,354	3.0	0.0	\$642.99	\$24,377.00	\$1,326.33	\$23,050.66	35.8	5,391
Domestic Water Heating Upgrade			0	0.0	9.8	\$99.14	\$2,138.28	\$50.00	\$2,088.28	21.1	1,149
	Install High Efficiency Gas Water Heater	No	0	0.0	3.0	\$30.20	\$2,109.60	\$50.00	\$2,059.60	68.2	350
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	6.8	\$68.94	\$28.68	\$0.00	\$28.68	0.4	799
Food Service Equipment & Refrigeration Measures			0	0.0	56.2	\$567.72	\$4,341.88	\$400.00	\$3,941.88	6.9	6,578
ECM 7	Dishwasher Replacement	Yes	0	0.0	56.2	\$567.72	\$4,341.88	\$400.00	\$3,941.88	6.9	6,578
Plug Load Equipment Control - Vending Machine			685	0.0	0.0	\$82.27	\$460.00	\$0.00	\$460.00	5.6	690
ECM 8	Vending Machine Control	Yes	685	0.0	0.0	\$82.27	\$460.00	\$0.00	\$460.00	5.6	690
TOTALS FOR HIGH PRIORITY MEASURES			12,648	2.1	63.0	\$2,155.65	\$12,836.01	\$1,650.00	\$11,186.01	5.2	20,113
TOTALS FOR ALL EVALUATED MEASURES			18,001	5.2	66.0	\$2,828.83	\$39,322.61	\$3,026.33	\$36,296.27	12.8	25,854

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Housing 3, L-P Dorms #37



Energy Conservation Measure		Recommend?	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			124,735	18.2	0.0	\$14,980.65	\$37,022.71	\$8,675.00	\$28,347.71	1.9	125,607
ECM 1	Install LED Fixtures	Yes	4,522	0.7	0.0	\$543.13	\$4,829.83	\$500.00	\$4,329.83	8.0	4,554
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	8,403	1.5	0.0	\$1,009.19	\$3,788.63	\$375.00	\$3,413.63	3.4	8,462
ECM 3	Retrofit Fixtures with LED Lamps	Yes	111,810	16.0	0.0	\$13,428.32	\$28,404.26	\$7,800.00	\$20,604.26	1.5	112,591
Lighting Control Measures			13,505	1.2	0.0	\$1,621.97	\$11,100.00	\$1,050.00	\$10,050.00	6.2	13,600
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	9,647	0.8	0.0	\$1,158.55	\$8,100.00	\$1,050.00	\$7,050.00	6.1	9,714
ECM 5	Install High/Low Lighting Controls	Yes	3,859	0.3	0.0	\$463.42	\$3,000.00	\$0.00	\$3,000.00	6.5	3,886
Domestic Water Heating Upgrade			0	0.0	74.6	\$753.53	\$7,127.70	\$0.00	\$7,127.70	9.5	8,730
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	74.6	\$753.53	\$7,127.70	\$0.00	\$7,127.70	9.5	8,730
TOTALS FOR HIGH PRIORITY MEASURES			138,240	19.3	74.6	\$17,356.15	\$55,250.41	\$9,725.00	\$45,525.41	2.6	147,937
TOTALS FOR ALL EVALUATED MEASURES			138,240	19.3	74.6	\$17,356.15	\$55,250.41	\$9,725.00	\$45,525.41	2.6	147,937

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Housing 2, A-K Dorms #38 & Support #39



Energy Conservation Measure		Recommend?	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			213,034	24.5	0.0	\$25,585.33	\$78,413.51	\$14,055.00	\$64,358.51	2.5	214,523
ECM 1	Install LED Fixtures	Yes	23,884	3.5	0.0	\$2,868.49	\$39,604.59	\$4,100.00	\$35,504.59	12.4	24,051
ECM 2	Retrofit Fixtures with LED Lamps	Yes	189,149	21.0	0.0	\$22,716.84	\$38,808.92	\$9,955.00	\$28,853.92	1.3	190,472
Lighting Control Measures			30,441	2.8	0.0	\$3,655.94	\$28,440.00	\$1,120.00	\$27,320.00	7.5	30,654
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	11,905	1.1	0.0	\$1,429.79	\$8,640.00	\$1,120.00	\$7,520.00	5.3	11,988
ECM 4	Install High/Low Lighting Controls	Yes	18,536	1.6	0.0	\$2,226.15	\$19,800.00	\$0.00	\$19,800.00	8.9	18,665
Motor Upgrades			2,099	0.5	0.0	\$252.13	\$9,439.10	\$0.00	\$9,439.10	37.4	2,114
	Premium Efficiency Motors	No	2,099	0.5	0.0	\$252.13	\$9,439.10	\$0.00	\$9,439.10	37.4	2,114
Variable Frequency Drive (VFD) Measures			21,050	6.7	0.0	\$2,528.13	\$35,292.50	\$3,960.00	\$31,332.50	12.4	21,197
	Install VFDs on Constant Volume (CV) HVAC	No	21,050	6.7	0.0	\$2,528.13	\$35,292.50	\$3,960.00	\$31,332.50	12.4	21,197
Electric Unitary HVAC Measures			145,808	92.6	0.0	\$17,511.51	\$283,778.10	\$13,606.51	\$270,171.59	15.4	146,827
	Install High Efficiency Heat Pumps	No	145,808	92.6	0.0	\$17,511.51	\$283,778.10	\$13,606.51	\$270,171.59	15.4	146,827
Gas Heating (HVAC/Process) Replacement			0	0.0	108.7	\$1,098.56	\$55,280.41	\$4,312.00	\$50,968.41	46.4	12,728
	Install High Efficiency Hot Water Boilers	No	0	0.0	108.7	\$1,098.56	\$55,280.41	\$4,312.00	\$50,968.41	46.4	12,728
Domestic Water Heating Upgrade			0	0.0	77.5	\$782.70	\$745.68	\$0.00	\$745.68	1.0	9,068
ECM 5	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	77.5	\$782.70	\$745.68	\$0.00	\$745.68	1.0	9,068
TOTALS FOR HIGH PRIORITY MEASURES			243,474	27.2	77.5	\$30,023.96	\$107,599.19	\$15,175.00	\$92,424.19	3.1	254,245
TOTALS FOR ALL EVALUATED MEASURES			412,432	127.1	186.2	\$51,414.29	\$491,389.29	\$37,053.51	\$454,335.79	8.8	437,112

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Multipurpose Rec. Center #41 & #42



Energy Conservation Measure		Recommend?	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			401,118	70.6	0.0	\$48,174.22	\$172,877.55	\$8,720.00	\$164,157.55	3.4	403,922
ECM 1	Install LED Fixtures	Yes	247,128	50.6	0.0	\$29,680.04	\$142,529.06	\$2,850.00	\$139,679.06	4.7	248,856
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	2,799	0.2	0.0	\$336.14	\$454.64	\$0.00	\$454.64	1.4	2,818
ECM 3	Retrofit Fixtures with LED Lamps	Yes	151,191	19.8	0.0	\$18,158.04	\$29,893.85	\$5,870.00	\$24,023.85	1.3	152,248
Lighting Control Measures			39,331	5.0	0.0	\$4,723.63	\$13,830.00	\$980.00	\$12,850.00	2.7	39,606
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	34,399	4.4	0.0	\$4,131.30	\$7,830.00	\$980.00	\$6,850.00	1.7	34,639
ECM 5	Install High/Low Lighting Controls	Yes	4,932	0.6	0.0	\$592.33	\$6,000.00	\$0.00	\$6,000.00	10.1	4,966
Motor Upgrades			11,951	2.3	0.0	\$1,435.36	\$33,364.10	\$0.00	\$33,364.10	23.2	12,035
ECM 6	Premium Efficiency Motors	Yes	11,951	2.3	0.0	\$1,435.36	\$33,364.10	\$0.00	\$33,364.10	23.2	12,035
Variable Frequency Drive (VFD) Measures			323,554	53.8	0.0	\$38,858.84	\$92,863.25	\$16,000.00	\$76,863.25	2.0	325,816
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	213,753	45.8	0.0	\$25,671.74	\$58,278.80	\$13,600.00	\$44,678.80	1.7	215,248
ECM 8	Install VFDs on Chilled Water Pumps	Yes	53,700	7.9	0.0	\$6,449.33	\$25,218.40	\$0.00	\$25,218.40	3.9	54,075
ECM 9	Install VFDs on Cooling Tower Fans	Yes	56,101	0.0	0.0	\$6,737.76	\$9,366.05	\$2,400.00	\$6,966.05	1.0	56,494
Electric Chiller Replacement			184,238	49.4	0.0	\$22,126.92	\$185,124.90	\$10,965.00	\$174,159.90	7.9	185,526
ECM 10	Install High Efficiency Chillers	Yes	184,238	49.4	0.0	\$22,126.92	\$185,124.90	\$10,965.00	\$174,159.90	7.9	185,526
Gas Heating (HVAC/Process) Replacement			0	0.0	226.8	\$2,291.60	\$77,689.84	\$6,528.00	\$71,161.84	31.1	26,551
	Install High Efficiency Hot Water Boilers	No	0	0.0	226.8	\$2,291.60	\$77,689.84	\$6,528.00	\$71,161.84	31.1	26,551
HVAC System Improvements			20,700	0.0	251.5	\$5,027.52	\$16,313.04	\$0.00	\$16,313.04	3.2	50,290
ECM 11	Implement Demand Control Ventilation	Yes	20,700	0.0	251.5	\$5,027.52	\$16,313.04	\$0.00	\$16,313.04	3.2	50,290
Domestic Water Heating Upgrade			0	0.0	42.6	\$430.90	\$179.25	\$0.00	\$179.25	0.4	4,993
ECM 12	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	42.6	\$430.90	\$179.25	\$0.00	\$179.25	0.4	4,993
Food Service Equipment & Refrigeration Measures			2,559	0.2	0.0	\$307.31	\$1,977.30	\$75.00	\$1,902.30	6.2	2,577
ECM 13	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,265	0.2	0.0	\$151.92	\$303.30	\$0.00	\$303.30	2.0	1,274
ECM 14	Refrigeration Controls	Yes	1,294	0.1	0.0	\$155.39	\$1,674.00	\$75.00	\$1,599.00	10.3	1,303
Plug Load Equipment Control - Vending Machine			3,909	0.0	0.0	\$469.44	\$920.00	\$0.00	\$920.00	2.0	3,936
ECM 15	Vending Machine Control	Yes	3,909	0.0	0.0	\$469.44	\$920.00	\$0.00	\$920.00	2.0	3,936
TOTALS FOR HIGH PRIORITY MEASURES			987,359	181.3	294.1	\$121,554.15	\$517,449.39	\$36,740.00	\$480,709.39	4.0	1,028,701
TOTALS FOR ALL EVALUATED MEASURES			987,359	181.3	520.9	\$123,845.75	\$595,139.23	\$43,268.00	\$551,871.23	4.5	1,055,251

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Water Plant, Storage, & Salt



Energy Conservation Measure		Recommend?	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			12,263	2.6	0.0	\$1,472.83	\$7,911.76	\$1,200.00	\$6,711.76	4.6	12,349
ECM 1	Install LED Fixtures	Yes	7,426	1.2	0.0	\$891.84	\$5,724.99	\$600.00	\$5,124.99	5.7	7,478
ECM 2	Retrofit Fixtures with LED Lamps	Yes	4,838	1.4	0.0	\$580.98	\$2,186.77	\$600.00	\$1,586.77	2.7	4,871
Lighting Control Measures			870	0.3	0.0	\$104.49	\$810.00	\$105.00	\$705.00	6.7	876
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	870	0.3	0.0	\$104.49	\$810.00	\$105.00	\$705.00	6.7	876
Motor Upgrades			3,877	0.6	0.0	\$465.58	\$5,973.92	\$0.00	\$5,973.92	12.8	3,904
	Premium Efficiency Motors	No	3,877	0.6	0.0	\$465.58	\$5,973.92	\$0.00	\$5,973.92	12.8	3,904
Gas Heating (HVAC/Process) Replacement			0	0.0	35.1	\$354.24	\$29,502.12	\$1,754.20	\$27,747.92	78.3	4,104
	Install High Efficiency Hot Water Boilers	No	0	0.0	17.8	\$179.64	\$22,489.08	\$1,754.20	\$20,734.88	115.4	2,081
	Install High Efficiency Unit Heaters	No	0	0.0	17.3	\$174.60	\$7,013.05	\$0.00	\$7,013.05	40.2	2,023
TOTALS FOR HIGH PRIORITY MEASURES			13,133	2.9	0.0	\$1,577.32	\$8,721.76	\$1,305.00	\$7,416.76	4.7	13,225
TOTALS FOR ALL EVALUATED MEASURES			17,010	3.5	35.1	\$2,397.13	\$44,197.80	\$3,059.20	\$41,138.60	17.2	21,233

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

College Center #50



Energy Conservation Measure		Recommend?	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			292,013	42.3	0.0	\$35,070.71	\$128,539.23	\$17,385.00	\$111,154.23	3.2	294,054
ECM 1	Install LED Fixtures	Yes	80,015	11.5	0.0	\$9,609.86	\$67,059.51	\$3,820.00	\$63,239.51	6.6	80,575
ECM 2	Retrofit Fixtures with LED Lamps	Yes	211,997	30.8	0.0	\$25,460.85	\$61,479.73	\$13,565.00	\$47,914.73	1.9	213,479
Lighting Control Measures			58,743	8.4	0.0	\$7,055.09	\$70,980.00	\$6,650.00	\$64,330.00	9.1	59,154
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	49,102	7.0	0.0	\$5,897.16	\$52,380.00	\$6,650.00	\$45,730.00	7.8	49,445
ECM 4	Install High/Low Lighting Controls	Yes	9,641	1.4	0.0	\$1,157.94	\$18,600.00	\$0.00	\$18,600.00	16.1	9,709
Motor Upgrades			56	0.0	0.0	\$6.76	\$4,981.48	\$0.00	\$4,981.48	736.4	57
ECM 5	Premium Efficiency Motors	Yes	56	0.0	0.0	\$6.76	\$4,981.48	\$0.00	\$4,981.48	736.4	57
Variable Frequency Drive (VFD) Measures			23,849	2.1	0.0	\$2,864.31	\$14,801.01	\$0.00	\$14,801.01	5.2	24,016
ECM 6	Install VFDs on Chilled Water Pumps	Yes	23,849	2.1	0.0	\$2,864.31	\$14,801.01	\$0.00	\$14,801.01	5.2	24,016
Food Service Equipment & Refrigeration Measures			16,583	1.2	0.0	\$1,991.67	\$14,290.20	\$450.00	\$13,840.20	6.9	16,699
ECM 7	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	7,453	0.9	0.0	\$895.08	\$4,246.20	\$0.00	\$4,246.20	4.7	7,505
ECM 8	Refrigeration Controls	Yes	9,131	0.3	0.0	\$1,096.59	\$10,044.00	\$450.00	\$9,594.00	8.7	9,194
TOTALS FOR HIGH PRIORITY MEASURES			391,245	54.0	0.0	\$46,988.54	\$233,591.93	\$24,485.00	\$209,106.93	4.5	393,981
TOTALS FOR ALL EVALUATED MEASURES			391,245	54.0	0.0	\$46,988.54	\$233,591.93	\$24,485.00	\$209,106.93	4.5	393,981

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

United Science Center 1 #51



Energy Conservation Measure		Recommend?	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			126,019	22.9	0.0	\$15,134.84	\$54,850.76	\$11,820.00	\$43,030.76	2.8	126,900
ECM 1	Install LED Fixtures	Yes	17,458	2.6	0.0	\$2,096.68	\$18,902.35	\$1,950.00	\$16,952.35	8.1	17,580
ECM 2	Retrofit Fixtures with LED Lamps	Yes	108,561	20.3	0.0	\$13,038.16	\$35,948.41	\$9,870.00	\$26,078.41	2.0	109,320
Lighting Control Measures			928	0.1	0.0	\$111.47	\$1,140.00	\$70.00	\$1,070.00	9.6	935
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	498	0.1	0.0	\$59.77	\$540.00	\$70.00	\$470.00	7.9	501
ECM 4	Install High/Low Lighting Controls	Yes	430	0.0	0.0	\$51.70	\$600.00	\$0.00	\$600.00	11.6	433
TOTALS FOR HIGH PRIORITY MEASURES			126,947	23.0	0.0	\$15,246.31	\$55,990.76	\$11,890.00	\$44,100.76	2.9	127,834
TOTALS FOR ALL EVALUATED MEASURES			126,947	23.0	0.0	\$15,246.31	\$55,990.76	\$11,890.00	\$44,100.76	2.9	127,834

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Solar Energy Generation Potential

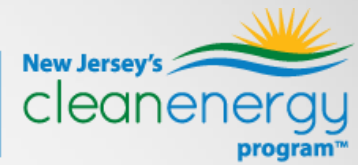


Building Name	None/Low	Medium	High
ATES Geothermal Manifold House #25	X		
Arts & Sciences #29		X	
A-D Wings #30			X
E-H Wings #31			X
I-M Wings #32, West Quad #34			X
N Wing #33			X
Auxiliary Fire Pump #35	X		
TRLC #36	X		
Housing 3 L-P Dorms #37		X	
Housing 2 A-K Dorms #38 & Support #39		X	
Multipurpose Rec. Center #41 & #42			X
Water Plant, Storage Salt	X		
College Center #50			X
Unified Science Center #51			X

For more information on the SREC Registration Program (SRP) please visit:

<http://www.njcleanenergy.com/renewable-energy/programs/solar-renewable-energy-certificates-srec/new-jersey-solar-renewable-energy>

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

Whole Buildings:

- Pay for Performance

Energy Generation:

- Combined Heat and Power (CHP)

OTHER PROGRAMS

Renewable Energy Generation:

- SREC Registration Program (SRP)

* eligible programs are highlighted in yellow

Recommended NJCEP Incentives per Building



Building Name	Pay for Performance	SmartStart	CTEEP
ATES Geothermal Manifold House #25		X	X
Arts & Sciences #29		X	X
A-D Wings #30	X*	X	X
E-H Wings #31		X	X
I-M Wings #32, West Quad #34		X	X
N Wing #33		X	X
Auxiliary Fire Pump #35		X	X
TRLC #36		X	X
Housing 3 L-P Dorms #37		X	X
Housing 2 A-K Dorms #38 & Support #39		X	X
Multipurpose Rec. Center #41 & #42		X	X
Water Plant, Storage Salt		X	X
College Center #50		X	X
Unified Science Center #51		X	X

* Pay for Performance eligibility would require an investment grade sub-meter in place for 12+ months prior to full program eligibility.

Pay for Performance: Overview



- Comprehensive, whole-building approach to saving energy in existing or new facilities
- Qualification based on energy consumption, energy savings and measure types
- Customer chooses from network of pre-approved ***Participating Partners***
- Incentives paid in three installments at milestones
 - Incentives up to \$2MM per project (\$4MM entity cap/year)
 - \$1 million for electric measures
 - \$1 million for gas measures
 - Incentives up to 50% of total project cost

www.NJCleanEnergy/P4P

Pay for Performance: Process



Submittal and
Approval of
Application

Development
and Approval of
Energy
Reduction Plan
(ERP)

Installation of
Recommended
Measures

Submittal and
Approval of
As-Built ERP and
Cx Report

Post
Construction
Verification of
Savings

Incentive #1
*fixed between
\$3,750-\$25,000*

Incentive #2
*up to 25%
project cost*

Incentive #3
*up to 25%
project cost*

1 year

Pay for Performance: Details



Incentive #1: Energy Reduction Plan			
Incentive Amount:		\$0.15	per sq ft
Minimum Incentive:		\$3,750	
Maximum Incentive:		\$25,000	or 50% of facility annual energy cost
Incentive #2: Installation of Recommended Measures			
Minimum Performance Target:		15%	
Electric Incentives	Base Incentive based on 15% savings:	\$0.09	per projected kWh saved
	For each % over 15% add:	\$0.005	
	Maximum Incentive:	\$0.11	
Gas Incentives	Base Incentive based on 15 % savings:	\$0.90	per projected Therm saved
	For each % over 15% add:	\$0.05	
	Maximum Incentive:	\$1.25	
Incentive Cap:		25%	of total project cost
Incentive #3: Post-Construction Benchmarking Report			
Minimum Performance Target:		15%	
Electric Incentives	Base Incentive based on 15% savings:	\$0.09	per projected kWh saved
	For each % over 15% add:	\$0.005	
	Maximum Incentive:	\$0.11	
Gas Incentives	Base Incentive based on 15% savings:	\$0.90	per projected Therm saved
	For each % over 15% add:	\$0.05	
	Maximum Incentive:	\$1.25	
Incentive Cap:		25%	of total project cost

SmartStart: Overview

- Two types of incentives for high efficiency equipment installation:
 - Prescriptive
 - Custom
- Project Categories:
 - New Construction
 - Renovation
 - Remodeling
 - Equipment Replacement
- Project pre-approval required for lighting and custom measures
- Incentives up to \$500,000 per electric account & \$500,000 per natural gas account
- Specific incentives and individual applications for Lighting, HVAC, VFDs, Refrigeration, Controls and more!

www.NJCleanEnergy/SSB

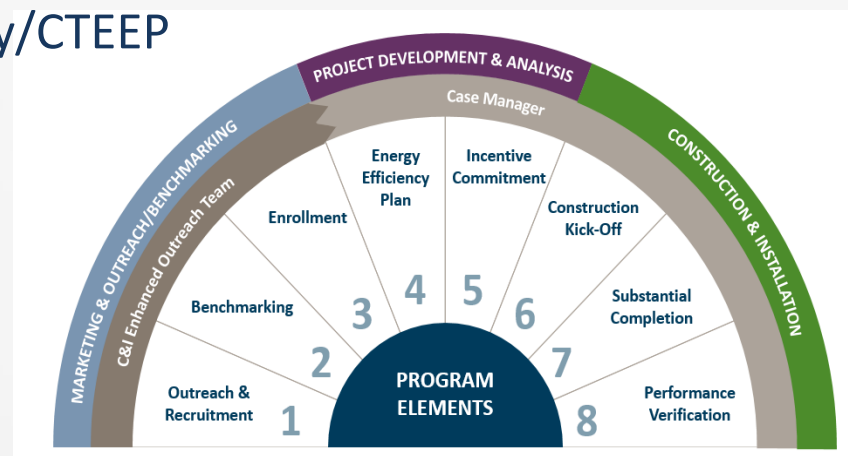
CTEEP: Overview



Customer Tailored Energy Efficiency Pilot (CTEEP)

- Provide customers with **on-site assistance** to discuss project opportunities and program incentives.
- A **single application** submission streamlines multiple prescriptive and custom measures.
- Provide **technical assistance incentives** to help offset soft costs associated with developing and planning an energy efficiency project.
- Incentives up to \$250,000 entity cap.

www.NJCleanEnergy/CTEEP



SmartStart, CTEEP & P4P:



Financing Option

- 0% Financing
- Up to \$130,000 for 10 years
- SJG can help guide you through the process

Contact:

Bruce Grossman – Program Manager

South Jersey Gas

#1 South Jersey Plaza

Folsom, NJ 08037

Phone: 609-561-9000, ext. 4271



Recommended NJCEP Incentives per Building



Building Name	Pay for Performance	SmartStart	CTEEP
ATES Geothermal Manifold House #25		X	X
Arts & Sciences #29		X	X
A-D Wings #30	X*	X	X
E-H Wings #31		X	X
I-M Wings #32, West Quad #34		X	X
N Wing #33		X	X
Auxiliary Fire Pump #35		X	X
TRLC #36		X	X
Housing 3 L-P Dorms #37		X	X
Housing 2 A-K Dorms #38 & Support #39		X	X
Multipurpose Rec. Center #41 & #42		X	X
Water Plant, Storage Salt		X	X
College Center #50		X	X
Unified Science Center #51		X	X

* Pay for Performance eligibility would require an investment grade sub-meter in place for 12+ months prior to full program eligibility.

Energy Savings Improvement Program (ESIP)

- Provides alternative financing for energy savings projects at public institutions. Value of energy savings leveraged to pay for cost of EE projects over a 15 year contract. Does not count as debt/require voter approval.
- Requires an audit as 1st step (LGEA satisfies requirement)
- ESIP participation question on LGEA application
- Program administered directly by BPU

ESIP Process

New Jersey's Clean Energy Program Interaction

Initial Energy Audit completed
for entity building(s)

Local Government Energy Audit
(LGEA) may be used to meet
this requirement

Entity issues ESIP RFP (previously
approved by BPU) and selects ESCO
or DIY approach

Investment Grade Energy Audit completed
and Energy Savings Plan (ESP)
developed

P4P Energy Reduction Plan (ERP),
Direct Install, or SmartStart application
recommended submittal time frame

Third party review of ESP

Review and approval of ESP
by Board of Public Utilities (BPU)

Entity adopts ESP,
determines guarantee



FOR MORE INFORMATION

ESIP

Mike Thulen

ESIP Coordinator

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Cell: 732-330-2419

ESIP@bpu.nj.gov

Questions



?

FOR MORE INFORMATION

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