

# New Jersey's Clean Energy Program

LGEA Exit Meeting for:  
*Newton Board of Education*

TRC Energy Services

February 5, 2019

# Introductions

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## *Newton Board of Education*

- Dr. Ken Greene – Superintendent
- Dr. Fred Savio – School Business Administrator/BOE Secretary
- Joe Van Kirk – Director of Facilities

## *NJ Clean Energy Program*

- Yagna Otia, CEM – TRC Auditor
- Sarah Walters – LGEA Account Manager
- Mike Mandzik – Outreach Account Manager
- Arif Welcher – BPU Ombudsman

# Agenda

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- 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 Newton BOE

# LGEA Process

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- 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:

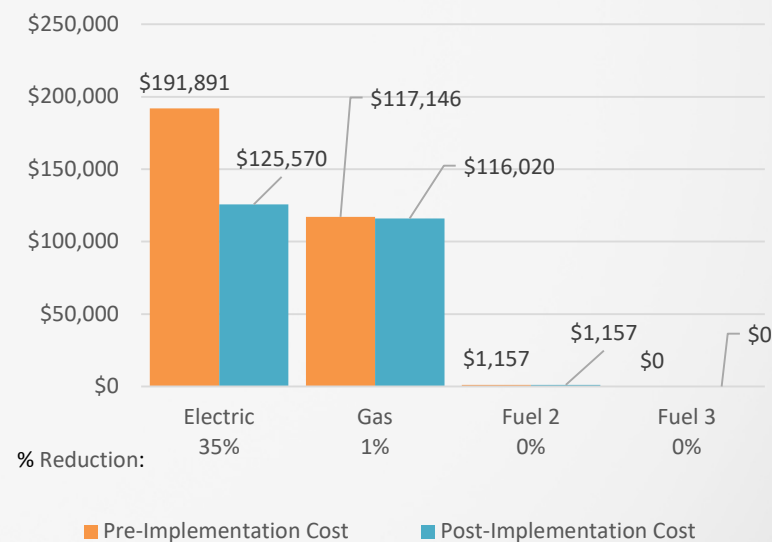
- Building Envelope
- Lighting System
- HVAC and Mechanical Systems
- Plug Load Equipment
- Kitchen Food Service Equipment

## Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs
- Solar Consumption & Costs

## Sites Visited/Analyzed

- Board Office
- Merriam Avenue
- Halsted Middle School
- Newton High School



# Benchmarking



## Newton High School

**ENERGY STAR® Statement of Energy Performance**

**38**  
ENERGY STAR® Score<sup>1</sup>

**Newton High School**  
Primary Property Type: K-12 School  
Gross Floor Area (ft<sup>2</sup>): 118,080  
Built: 1945  
For Year Ending: May 31, 2018  
Date Generated: December 03, 2016

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

**Property & Contact Information**

Property Address	Property Owner	Primary Contact
Newton High School 44 Myerson Ave. Newton, New Jersey 07860		

Property ID: EE03500

**Energy Consumption and Energy Use Intensity (EUI)**

Site EUI		Annual Energy by Fuel		National Median Comparisons	
85.8 kBtu/ft <sup>2</sup>		Electric - Grid (kBtu)	2,520,894 (27%)	National Median Site EUI (kBtu/ft <sup>2</sup> )	101.1
		Electric - Solar (kBtu)	275,400 (4%)	National Median Source EUI (kBtu/ft <sup>2</sup> )	111.2
		Natural Gas (kBtu)	7,803,197 (75%)	% Diff from National Median Source EUI	-12%
<b>Source EUI</b>	<b>125.4 kBtu/ft<sup>2</sup></b>	Renewable Production Greenhouse Gas Emissions (Metric Tons CO2e/year)			

**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)

Building Name	ENERGY STAR Score
Board Office	45
Merriam Avenue	26
Halsted Middle School	59
Newton High School	38

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.

# 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 <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>	<b>340,269</b>	<b>109.3</b>	<b>-52.7</b>	<b>\$45,698</b>	<b>\$276,888</b>	<b>\$47,203</b>	<b>\$229,685</b>	<b>5.0</b>	<b>336,473</b>
Install LED Fixtures	93,880	16.6	-1.6	\$12,698	\$107,531	\$9,345	\$98,186	7.7	94,353
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	599	0.2	-0.1	\$80	\$386	\$60	\$326	4.1	589
Retrofit Fixtures with LED Lamps	245,789	92.6	-51.0	\$32,920	\$168,971	\$37,798	\$131,173	4.0	241,531
<b>Lighting Control Measures</b>	<b>40,379</b>	<b>13.4</b>	<b>-8.4</b>	<b>\$5,394</b>	<b>\$48,960</b>	<b>\$4,410</b>	<b>\$44,550</b>	<b>8.3</b>	<b>39,673</b>
Install Occupancy Sensor Lighting Controls	31,765	10.5	-6.6	\$4,239	\$34,760	\$4,140	\$30,620	7.2	31,209
Install High/Low Lighting Controls	8,614	3.0	-1.8	\$1,155	\$14,200	\$270	\$13,930	12.1	8,464
<b>Motor Upgrades</b>	<b>13,700</b>	<b>4.4</b>	<b>0.0</b>	<b>\$1,864</b>	<b>\$80,947</b>	<b>\$0</b>	<b>\$80,947</b>	<b>43.4</b>	<b>13,796</b>
Premium Efficiency Motors	13,700	4.4	0.0	\$1,864	\$80,947	\$0	\$80,947	43.4	13,796
<b>Variable Frequency Drive (VFD) Measures</b>	<b>85,526</b>	<b>23.7</b>	<b>0.0</b>	<b>\$11,657</b>	<b>\$80,104</b>	<b>\$6,583</b>	<b>\$73,521</b>	<b>6.3</b>	<b>86,124</b>
Install VFDs on Constant Volume (CV) Fans	28,511	8.3	0.0	\$3,910	\$19,223	\$2,320	\$16,903	4.3	28,711
Install VFDs on Heating Water Pumps	33,941	6.0	0.0	\$4,601	\$35,523	\$0	\$35,523	7.7	34,178
Install Boiler Draft Fan VFDs	20,602	8.6	0.0	\$2,813	\$19,343	\$4,263	\$15,080	5.4	20,746
Install Air Compressors with VFDs	2,471	0.9	0.0	\$332	\$6,015	\$0	\$6,015	18.1	2,489
<b>Electric Unitary HVAC Measures</b>	<b>8,282</b>	<b>4.9</b>	<b>0.0</b>	<b>\$1,140</b>	<b>\$53,358</b>	<b>\$1,104</b>	<b>\$52,254</b>	<b>45.8</b>	<b>8,339</b>
Install High Efficiency Air Conditioning Units	8,282	4.9	0.0	\$1,140	\$53,358	\$1,104	\$52,254	45.8	8,339
<b>Gas Heating (HVAC/Process) Replacement</b>	<b>0</b>	<b>0.0</b>	<b>1,861.9</b>	<b>\$14,377</b>	<b>\$398,557</b>	<b>\$5,175</b>	<b>\$393,382</b>	<b>27.4</b>	<b>218,008</b>
Install High Efficiency Hot Water Boilers	0	0.0	1,837.0	\$14,165	\$390,572	\$3,575	\$386,997	27.3	215,087
Install High Efficiency Furnaces	0	0.0	17.1	\$136	\$6,145	\$1,600	\$4,545	33.3	2,006
Install High Efficiency Unit Heaters	0	0.0	7.8	\$76	\$1,841	\$0	\$1,841	24.2	915
<b>HVAC System Improvements</b>	<b>643</b>	<b>0.0</b>	<b>47.9</b>	<b>\$496</b>	<b>\$3,114</b>	<b>\$0</b>	<b>\$3,114</b>	<b>6.3</b>	<b>6,252</b>
Implement Demand Control Ventilation (DCV)	643	0.0	4.0	\$120	\$2,719	\$0	\$2,719	22.6	1,116
Install Pipe Insulation	0	0.0	43.9	\$376	\$396	\$0	\$396	1.1	5,136
<b>Domestic Water Heating Upgrade</b>	<b>9,451</b>	<b>0.0</b>	<b>166.4</b>	<b>\$2,514</b>	<b>\$2,891</b>	<b>\$0</b>	<b>\$2,891</b>	<b>1.2</b>	<b>29,002</b>
Install Low-Flow DHW Devices	9,451	0.0	166.4	\$2,514	\$2,891	\$0	\$2,891	1.2	29,002
<b>Food Service Equipment &amp; Refrigeration Measures</b>	<b>15,718</b>	<b>1.8</b>	<b>0.0</b>	<b>\$2,121</b>	<b>\$16,352</b>	<b>\$360</b>	<b>\$15,992</b>	<b>7.5</b>	<b>15,828</b>
Refrigerator/Freezer Case Electrically Commutated Motors	2,359	0.3	0.0	\$318	\$3,943	\$360	\$3,583	11.3	2,376
Replace Refrigeration Equipment	13,359	1.5	0.0	\$1,803	\$12,409	\$0	\$12,409	6.9	13,452
<b>Plug Load Equipment Control - Vending Machine</b>	<b>5,118</b>	<b>0.6</b>	<b>0.0</b>	<b>\$690</b>	<b>\$1,150</b>	<b>\$0</b>	<b>\$1,150</b>	<b>1.7</b>	<b>5,153</b>
Vending Machine Control	5,118	0.6	0.0	\$690	\$1,150	\$0	\$1,150	1.7	5,153
<b>Custom Measures</b>	<b>25,486</b>	<b>5.5</b>	<b>2,032.1</b>	<b>\$18,437</b>	<b>\$349,200</b>	<b>\$0</b>	<b>\$349,200</b>	<b>18.9</b>	<b>263,601</b>
Custom DDC Measure	25,486	5.5	2,032.1	\$18,437	\$349,200	\$0	\$349,200	18.9	263,601
<b>TOTALS</b>	<b>544,571</b>	<b>163.7</b>	<b>4,047.1</b>	<b>\$104,387</b>	<b>\$1,311,522</b>	<b>\$64,835</b>	<b>\$1,246,688</b>	<b>11.9</b>	<b>1,022,248</b>

\* - 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).

# 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 Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>340,269</b>	<b>109.3</b>	<b>-52.7</b>	<b>\$45,698</b>	<b>\$276,888</b>	<b>\$47,203</b>	<b>\$229,685</b>	<b>5.0</b>	<b>336,473</b>
ECM 1	Install LED Fixtures	93,880	16.6	-1.6	\$12,698	\$107,531	\$9,345	\$98,186	7.7	94,353
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	599	0.2	-0.1	\$80	\$386	\$60	\$326	4.1	589
ECM 3	Retrofit Fixtures with LED Lamps	245,789	92.6	-51.0	\$32,920	\$168,971	\$37,798	\$131,173	4.0	241,531
<b>Lighting Control Measures</b>		<b>40,379</b>	<b>13.4</b>	<b>-8.4</b>	<b>\$5,394</b>	<b>\$48,960</b>	<b>\$4,410</b>	<b>\$44,550</b>	<b>8.3</b>	<b>39,673</b>
ECM 4	Install Occupancy Sensor Lighting Controls	31,765	10.5	-6.6	\$4,239	\$34,760	\$4,140	\$30,620	7.2	31,209
ECM 5	Install High/Low Lighting Controls	8,614	3.0	-1.8	\$1,155	\$14,200	\$270	\$13,930	12.1	8,464
<b>Variable Frequency Drive (VFD) Measures</b>		<b>81,553</b>	<b>20.9</b>	<b>0.0</b>	<b>\$11,122</b>	<b>\$68,180</b>	<b>\$5,808</b>	<b>\$62,373</b>	<b>5.6</b>	<b>82,123</b>
ECM 6	Install VFDs on Constant Volume (CV) Fans	28,511	8.3	0.0	\$3,910	\$19,223	\$2,320	\$16,903	4.3	28,711
ECM 7	Install VFDs on Heating Water Pumps	33,941	6.0	0.0	\$4,601	\$35,523	\$0	\$35,523	7.7	34,178
ECM 8	Install Boiler Draft Fan VFDs	19,100	6.7	0.0	\$2,611	\$13,434	\$3,488	\$9,947	3.8	19,234
<b>HVAC System Improvements</b>		<b>0</b>	<b>0.0</b>	<b>43.9</b>	<b>\$376</b>	<b>\$396</b>	<b>\$0</b>	<b>\$396</b>	<b>1.1</b>	<b>5,136</b>
ECM 9	Install Pipe Insulation	0	0.0	43.9	\$376	\$396	\$0	\$396	1.1	5,136
<b>Domestic Water Heating Upgrade</b>		<b>9,451</b>	<b>0.0</b>	<b>166.4</b>	<b>\$2,514</b>	<b>\$2,891</b>	<b>\$0</b>	<b>\$2,891</b>	<b>1.2</b>	<b>29,002</b>
ECM 10	Install Low-Flow DHW Devices	9,451	0.0	166.4	\$2,514	\$2,891	\$0	\$2,891	1.2	29,002
<b>Food Service Equipment &amp; Refrigeration Measures</b>		<b>12,352</b>	<b>1.4</b>	<b>0.0</b>	<b>\$1,664</b>	<b>\$10,293</b>	<b>\$0</b>	<b>\$10,293</b>	<b>6.2</b>	<b>12,439</b>
ECM 11	Replace Refrigeration Equipment	12,352	1.4	0.0	\$1,664	\$10,293	\$0	\$10,293	6.2	12,439
<b>Plug Load Equipment Control - Vending Machine</b>		<b>5,118</b>	<b>0.6</b>	<b>0.0</b>	<b>\$690</b>	<b>\$1,150</b>	<b>\$0</b>	<b>\$1,150</b>	<b>1.7</b>	<b>5,153</b>
ECM 12	Vending Machine Control	5,118	0.6	0.0	\$690	\$1,150	\$0	\$1,150	1.7	5,153
<b>TOTALS</b>		<b>489,122</b>	<b>145.7</b>	<b>149.1</b>	<b>\$67,458</b>	<b>\$408,758</b>	<b>\$57,421</b>	<b>\$351,337</b>	<b>5.2</b>	<b>509,998</b>

\* - 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).



# Board Office



#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>9,504</b>	<b>4.5</b>	<b>-2</b>	<b>\$1,260</b>	<b>\$18,905</b>	<b>\$7,937</b>	<b>\$1,666</b>	<b>\$6,271</b>	<b>5.0</b>	<b>9,353</b>
ECM 1	Install LED Fixtures	626	0.1	0	\$84	\$1,264	\$966	\$100	\$866	10.3	631
ECM 2	Retrofit Fixtures with LED Lamps	8,878	4.4	-2	\$1,176	\$17,641	\$6,971	\$1,566	\$5,405	4.6	8,722
<b>Lighting Control Measures</b>		<b>1,867</b>	<b>0.9</b>	<b>0</b>	<b>\$247</b>	<b>\$1,979</b>	<b>\$2,946</b>	<b>\$585</b>	<b>\$2,361</b>	<b>9.5</b>	<b>1,834</b>
ECM 3	Install Occupancy Sensor Lighting Controls	1,663	0.8	0	\$220	\$1,763	\$2,546	\$315	\$2,231	10.1	1,634
ECM 4	Install High/Low Lighting Controls	204	0.1	0	\$27	\$216	\$400	\$270	\$130	4.8	200
<b>Gas Heating (HVAC/Process) Replacement</b>		<b>0</b>	<b>0.0</b>	<b>8</b>	<b>\$76</b>	<b>\$1,140</b>	<b>\$1,841</b>	<b>\$0</b>	<b>\$1,841</b>	<b>24.2</b>	<b>915</b>
	Install High Efficiency Unit Heaters	0	0.0	8	\$76	\$1,140	\$1,841	\$0	\$1,841	24.2	915
ECM 5	Install Pipe Insulation	0	0.0	21	\$207	\$2,278	\$264	\$0	\$264	1.3	2,494
<b>Domestic Water Heating Upgrade</b>		<b>726</b>	<b>0.0</b>	<b>0</b>	<b>\$98</b>	<b>\$977</b>	<b>\$29</b>	<b>\$0</b>	<b>\$29</b>	<b>0.3</b>	<b>731</b>
ECM 6	Install Low-Flow DHW Devices	726	0.0	0	\$98	\$977	\$29	\$0	\$29	0.3	731
<b>TOTALS</b>		<b>12,097</b>	<b>5.4</b>	<b>27</b>	<b>\$1,888</b>	<b>\$25,279</b>	<b>\$13,016</b>	<b>\$2,251</b>	<b>\$10,765</b>	<b>5.7</b>	<b>15,328</b>

\* - All incentives presented in this table are based on NJ SmartStart 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).

# Merriam Avenue



#	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>80,982</b>	<b>28.8</b>	<b>-13</b>	<b>\$11,041</b>	<b>\$165,609</b>	<b>\$85,196</b>	<b>\$14,924</b>	<b>\$70,272</b>	<b>6.4</b>	<b>80,010</b>
ECM 1	Install LED Fixtures	Yes	18,127	2.5	0	\$2,495	\$37,421	\$36,707	\$3,800	\$32,907	13.2	18,254
ECM 2	Retrofit Fixtures with LED Lamps	Yes	62,855	26.4	-13	\$8,546	\$128,188	\$48,489	\$11,124	\$37,365	4.4	61,756
<b>Lighting Control Measures</b>			<b>5,397</b>	<b>2.2</b>	<b>-1</b>	<b>\$734</b>	<b>\$5,870</b>	<b>\$10,338</b>	<b>\$595</b>	<b>\$9,743</b>	<b>13.3</b>	<b>5,303</b>
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	2,939	1.2	-1	\$400	\$3,197	\$4,938	\$595	\$4,343	10.9	2,887
ECM 4	Install High/Low Lighting Controls	Yes	2,458	1.0	-1	\$334	\$2,674	\$5,400	\$0	\$5,400	16.2	2,415
<b>Motor Upgrades</b>			<b>6,475</b>	<b>1.8</b>	<b>0</b>	<b>\$891</b>	<b>\$13,367</b>	<b>\$43,705</b>	<b>\$0</b>	<b>\$43,705</b>	<b>49.0</b>	<b>6,520</b>
	Premium Efficiency Motors	No	6,475	1.8	0	\$891	\$13,367	\$43,705	\$0	\$43,705	49.0	6,520
<b>Variable Frequency Drive (VFD) Measures</b>			<b>45,521</b>	<b>12.5</b>	<b>0</b>	<b>\$6,265</b>	<b>\$93,973</b>	<b>\$35,933</b>	<b>\$3,858</b>	<b>\$32,076</b>	<b>5.1</b>	<b>45,840</b>
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	24,123	6.9	0	\$3,320	\$49,800	\$15,947	\$1,920	\$14,027	4.2	24,292
ECM 6	Install VFDs on Heating Water Pumps	Yes	8,776	1.9	0	\$1,208	\$18,117	\$13,103	\$0	\$13,103	10.8	8,838
ECM 7	Install Boiler Draft Fan VFDs	Yes	12,622	3.7	0	\$1,737	\$26,056	\$6,883	\$1,938	\$4,945	2.8	12,710
<b>Electric Unitary HVAC Measures</b>			<b>8,282</b>	<b>4.9</b>	<b>0</b>	<b>\$1,140</b>	<b>\$17,096</b>	<b>\$53,358</b>	<b>\$1,104</b>	<b>\$52,254</b>	<b>45.8</b>	<b>8,339</b>
	Install High Efficiency Air Conditioning Units	No	8,282	4.9	0	\$1,140	\$17,096	\$53,358	\$1,104	\$52,254	45.8	8,339
<b>Gas Heating (HVAC/Process) Replacement</b>			<b>0</b>	<b>0.0</b>	<b>1,065</b>	<b>\$8,475</b>	<b>\$169,509</b>	<b>\$140,543</b>	<b>\$5,175</b>	<b>\$135,368</b>	<b>16.0</b>	<b>124,697</b>
	Install High Efficiency Hot Water Boilers	No	0	0.0	1,048	\$8,339	\$166,782	\$134,399	\$3,575	\$130,824	15.7	122,691
	Install High Efficiency Furnaces	No	0	0.0	17	\$136	\$2,726	\$6,145	\$1,600	\$4,545	33.3	2,006
<b>HVAC System Improvements</b>			<b>643</b>	<b>0.0</b>	<b>4</b>	<b>\$120</b>	<b>\$1,805</b>	<b>\$2,719</b>	<b>\$0</b>	<b>\$2,719</b>	<b>22.6</b>	<b>1,116</b>
	Implement Demand Control Ventilation (DCV)	No	643	0.0	4	\$120	\$1,805	\$2,719	\$0	\$2,719	22.6	1,116
<b>Domestic Water Heating Upgrade</b>			<b>0</b>	<b>0.0</b>	<b>17</b>	<b>\$139</b>	<b>\$1,386</b>	<b>\$186</b>	<b>\$0</b>	<b>\$186</b>	<b>1.3</b>	<b>2,039</b>
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	17	\$139	\$1,386	\$186	\$0	\$186	1.3	2,039
<b>Food Service &amp; Refrigeration Measures</b>			<b>1,007</b>	<b>0.1</b>	<b>0</b>	<b>\$139</b>	<b>\$1,663</b>	<b>\$2,116</b>	<b>\$0</b>	<b>\$2,116</b>	<b>15.3</b>	<b>1,014</b>
	Replace Refrigeration Equipment	No	1,007	0.1	0	\$139	\$1,663	\$2,116	\$0	\$2,116	15.3	1,014
<b>TOTALS</b>			<b>148,306</b>	<b>50.4</b>	<b>1,072</b>	<b>\$28,943</b>	<b>\$470,277</b>	<b>\$374,095</b>	<b>\$25,656</b>	<b>\$348,440</b>	<b>12.0</b>	<b>274,877</b>

\* - All incentives presented in this table are based on NJ SmartStart 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).

#	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>59,057</b>	<b>19.5</b>	<b>-11</b>	<b>\$7,860</b>	<b>\$117,904</b>	<b>\$42,642</b>	<b>\$7,996</b>	<b>\$34,646</b>	<b>4.4</b>	<b>58,147</b>
ECM 1	Install LED Fixtures	Yes	12,102	2.9	-2	\$1,617	\$24,248	\$10,763	\$885	\$9,878	6.1	12,006
ECM 2	Retrofit Fixtures with LED Lamps	Yes	46,954	16.7	-10	\$6,244	\$93,655	\$31,879	\$7,111	\$24,768	4.0	46,141
<b>Lighting Control Measures</b>			<b>9,467</b>	<b>3.0</b>	<b>-2</b>	<b>\$1,259</b>	<b>\$10,070</b>	<b>\$11,750</b>	<b>\$1,130</b>	<b>\$10,620</b>	<b>8.4</b>	<b>9,301</b>
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	8,030	2.5	-2	\$1,068	\$8,541	\$8,950	\$1,130	\$7,820	7.3	7,889
ECM 4	Install High/Low Lighting Controls	Yes	1,437	0.5	0	\$191	\$1,529	\$2,800	\$0	\$2,800	14.7	1,412
<b>Motor Upgrades</b>			<b>4,385</b>	<b>1.4</b>	<b>0</b>	<b>\$590</b>	<b>\$8,849</b>	<b>\$30,231</b>	<b>\$0</b>	<b>\$30,231</b>	<b>51.2</b>	<b>4,416</b>
	Premium Efficiency Motors	No	4,385	1.4	0	\$590	\$8,849	\$30,231	\$0	\$30,231	51.2	4,416
<b>Variable Frequency Drive (VFD) Measures</b>			<b>13,688</b>	<b>4.8</b>	<b>0</b>	<b>\$1,841</b>	<b>\$27,620</b>	<b>\$21,215</b>	<b>\$1,175</b>	<b>\$20,040</b>	<b>10.9</b>	<b>13,783</b>
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	4,388	1.4	0	\$590	\$8,855	\$3,276	\$400	\$2,876	4.9	4,419
ECM 6	Install VFDs on Heating Water Pumps	Yes	5,327	0.6	0	\$717	\$10,749	\$6,015	\$0	\$6,015	8.4	5,364
	Install Boiler Draft Fan VFDs	No	1,501	1.9	0	\$202	\$3,030	\$5,908	\$775	\$5,133	25.4	1,512
	Install Air Compressors with VFDs	No	2,471	0.9	0	\$332	\$4,987	\$6,015	\$0	\$6,015	18.1	2,489
<b>Gas Heating (HVAC/Process) Replacement</b>			<b>0</b>	<b>0.0</b>	<b>253</b>	<b>\$1,889</b>	<b>\$37,779</b>	<b>\$115,663</b>	<b>\$0</b>	<b>\$115,663</b>	<b>61.2</b>	<b>29,574</b>
	Install High Efficiency Hot Water Boilers	No	0	0.0	253	\$1,889	\$37,779	\$115,663	\$0	\$115,663	61.2	29,574
<b>HVAC System Improvements</b>			<b>0</b>	<b>0.0</b>	<b>23</b>	<b>\$169</b>	<b>\$1,856</b>	<b>\$132</b>	<b>\$0</b>	<b>\$132</b>	<b>0.8</b>	<b>2,642</b>
ECM 7	Install Pipe Insulation	Yes	0	0.0	23	\$169	\$1,856	\$132	\$0	\$132	0.8	2,642
<b>Domestic Water Heating Upgrade</b>			<b>0</b>	<b>0.0</b>	<b>52</b>	<b>\$388</b>	<b>\$3,879</b>	<b>\$772</b>	<b>\$0</b>	<b>\$772</b>	<b>2.0</b>	<b>6,073</b>
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	52	\$388	\$3,879	\$772	\$0	\$772	2.0	6,073
<b>Food Service &amp; Refrigeration Measures</b>			<b>7,072</b>	<b>0.8</b>	<b>0</b>	<b>\$951</b>	<b>\$9,898</b>	<b>\$6,483</b>	<b>\$0</b>	<b>\$6,483</b>	<b>6.8</b>	<b>7,121</b>
ECM 9	Replace Refrigeration Equipment	Yes	5,460	0.6	0	\$734	\$8,814	\$6,253	\$0	\$6,253	8.5	5,498
ECM 10	Vending Machine Control	Yes	1,612	0.2	0	\$217	\$1,084	\$230	\$0	\$230	1.1	1,623
<b>Custom Measures</b>			<b>9,872</b>	<b>1.8</b>	<b>651</b>	<b>\$6,200</b>	<b>\$0</b>	<b>\$183,600</b>	<b>\$0</b>	<b>\$183,600</b>	<b>29.6</b>	<b>86,213</b>
	Install Building Automation System	No	9,872	1.8	651	\$6,200	\$0	\$183,600	\$0	\$183,600	29.6	86,213
<b>TOTALS</b>			<b>103,539</b>	<b>31.3</b>	<b>965</b>	<b>\$21,147</b>	<b>\$217,854</b>	<b>\$412,488</b>	<b>\$10,301</b>	<b>\$402,187</b>	<b>19.0</b>	<b>217,269</b>

\* - All incentives presented in this table are based on NJ SmartStart 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).

# Newton High School



#	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Lifetime Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			<b>190,726</b>	<b>56.4</b>	<b>-26</b>	<b>\$25,537</b>	<b>\$383,053</b>	<b>\$141,113</b>	<b>\$22,617</b>	<b>\$118,496</b>	<b>4.6</b>	<b>188,964</b>
ECM 1	Install LED Fixtures	Yes	63,024	11.1	0	\$8,502	\$127,537	\$59,095	\$4,560	\$54,535	6.4	63,462
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	599	0.2	0	\$80	\$1,199	\$386	\$60	\$326	4.1	589
ECM 3	Retrofit Fixtures with LED Lamps	Yes	127,102	45.1	-26	\$16,954	\$254,317	\$81,632	\$17,997	\$63,635	3.8	124,912
<b>Lighting Control Measures</b>			<b>23,648</b>	<b>7.3</b>	<b>-5</b>	<b>\$3,154</b>	<b>\$25,233</b>	<b>\$23,926</b>	<b>\$2,100</b>	<b>\$21,826</b>	<b>6.9</b>	<b>23,235</b>
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	19,133	5.9	-4	\$2,552	\$20,415	\$18,326	\$2,100	\$16,226	6.4	18,798
ECM 5	Install High/Low Lighting Controls	Yes	4,515	1.4	-1	\$602	\$4,818	\$5,600	\$0	\$5,600	9.3	4,436
<b>Motor Upgrades</b>			<b>2,840</b>	<b>1.2</b>	<b>0</b>	<b>\$383</b>	<b>\$5,746</b>	<b>\$7,011</b>	<b>\$0</b>	<b>\$7,011</b>	<b>18.3</b>	<b>2,859</b>
	Premium Efficiency Motors	No	2,840	1.2	0	\$383	\$5,746	\$7,011	\$0	\$7,011	18.3	2,859
<b>Variable Frequency Drive (VFD) Measures</b>			<b>26,317</b>	<b>6.4</b>	<b>0</b>	<b>\$3,550</b>	<b>\$53,256</b>	<b>\$22,956</b>	<b>\$1,550</b>	<b>\$21,406</b>	<b>6.0</b>	<b>26,501</b>
ECM 6	Install VFDs on Heating Water Pumps	Yes	19,838	3.5	0	\$2,676	\$40,146	\$16,404	\$0	\$16,404	6.1	19,977
ECM 7	Install Boiler Draft Fan VFDs	Yes	6,478	3.0	0	\$874	\$13,110	\$6,552	\$1,550	\$5,002	5.7	6,524
<b>Gas Heating (HVAC/Process) Replacement</b>			<b>0</b>	<b>0.0</b>	<b>537</b>	<b>\$3,937</b>	<b>\$78,733</b>	<b>\$140,510</b>	<b>\$0</b>	<b>\$140,510</b>	<b>35.7</b>	<b>62,822</b>
	Install High Efficiency Hot Water Boilers	No	0	0.0	537	\$3,937	\$78,733	\$140,510	\$0	\$140,510	35.7	62,822
<b>Domestic Water Heating Upgrade</b>			<b>8,725</b>	<b>0.0</b>	<b>97</b>	<b>\$1,890</b>	<b>\$18,897</b>	<b>\$1,905</b>	<b>\$0</b>	<b>\$1,905</b>	<b>1.0</b>	<b>20,158</b>
ECM 8	Install Low-Flow DHW Devices	Yes	8,725	0.0	97	\$1,890	\$18,897	\$1,905	\$0	\$1,905	1.0	20,158
<b>Food Service &amp; Refrigeration Measures</b>			<b>12,758</b>	<b>1.5</b>	<b>0</b>	<b>\$1,721</b>	<b>\$18,298</b>	<b>\$8,903</b>	<b>\$360</b>	<b>\$8,543</b>	<b>5.0</b>	<b>12,847</b>
	Refrigerator/Freezer Case Electrically Commutated Motors	No	2,359	0.3	0	\$318	\$4,774	\$3,943	\$360	\$3,583	11.3	2,376
ECM 10	Vending Machine Control	Yes	3,506	0.4	0	\$473	\$2,365	\$920	\$0	\$920	1.9	3,530
<b>Custom Measures</b>			<b>15,614</b>	<b>3.7</b>	<b>1,381</b>	<b>\$12,237</b>	<b>\$0</b>	<b>\$165,600</b>	<b>\$0</b>	<b>\$165,600</b>	<b>13.5</b>	<b>177,388</b>
	Install Building Automation System	No	15,614	3.7	1,381	\$12,237	\$0	\$165,600	\$0	\$165,600	13.5	177,388
<b>TOTALS</b>			<b>280,628</b>	<b>76.6</b>	<b>1,983</b>	<b>\$52,409</b>	<b>\$583,216</b>	<b>\$511,923</b>	<b>\$26,627</b>	<b>\$485,296</b>	<b>9.3</b>	<b>514,774</b>

\* - All incentives presented in this table are based on NJ SmartStart 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



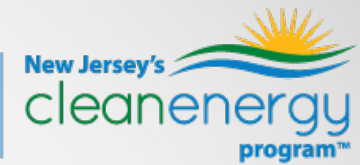
	Board Office	Merriam Avenue	Halsted Middle School	Newton High School
<i>Potential:</i>	<b>Low</b>	<b>Low</b>	<b>HIGH</b>	<b>HIGH</b>
<i>System Potential: (kW)</i>	15	38	96	225
<i>Electric Generation: (kWh per year)</i>	17,870	45,272	114,371	268,059
<i>Displaced Cost: (per year)</i>	\$2,400	\$6,230	\$15,390	\$36,160

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

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- 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



Entity Name	Pay For Performance	Direct Install	SmartStart	CTEP
Board Office		X	X	X
Merriam Avenue		X	X	X
Halsted Middle School		X	X	X
Newton High School	X		X	X



# 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](http://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

# Direct Install: Overview

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- Turn-key retrofit program to replace outdated and inefficient equipment, including lighting, HVAC, refrigeration, etc.
- Open to Small to Mid-Sized Commercial and Industrial facilities with an average electric demand  $\leq 200$  kW
- Provides incentives of up to 70% of the installed cost
- Incentives are paid directly to the contractor
  - Customer only pays remaining 30% of installed cost
  - \$125,000 project/building cap
  - \$250,000 per entity cap (up to \$500,000 if using ESIP)
- Participating contractors provide support and process all paperwork
- Fast turnaround time: Average length of time for job completion (4-6 months)

# Direct Install:

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## Participating Contractor

**Lime Energy**

Tony McCoy

855-600-5463

[njdi@lime-energy.com](mailto:njdi@lime-energy.com)

# SmartStart: Overview

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- 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](http://www.NJCleanEnergy/SSB)

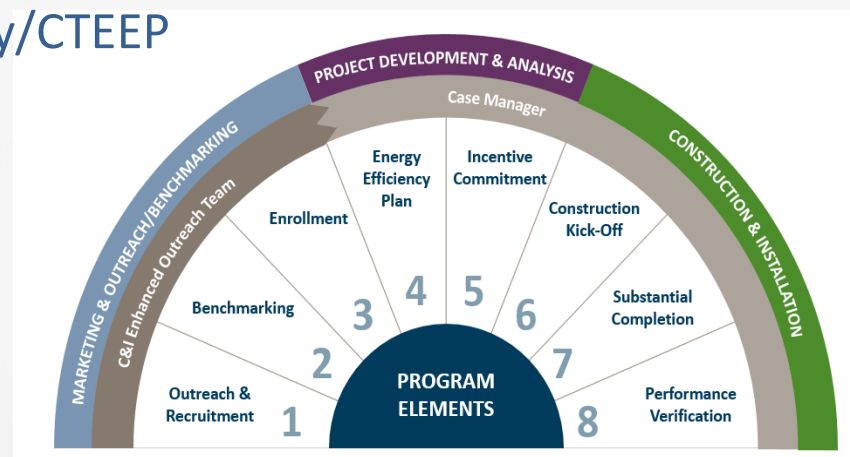
# CTEEP: Overview



## 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](http://www.NJCleanEnergy/CTEEP)



# Recommended NJCEP Incentives per Building



Entity Name	Pay For Performance	Direct Install	SmartStart	CTEEP
Board Office		X	X	X
Merriam Avenue		X	X	X
Halsted Middle School		X	X	X
Newton High School	X		X	X



## 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 1<sup>st</sup> 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

Office: 609-777-3338

Cell: 732-330-2419

[ESIP@bpu.nj.gov](mailto:ESIP@bpu.nj.gov)

# Questions

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## FOR MORE INFORMATION

**Visit** [NJCleanEnergy.com](http://NJCleanEnergy.com)

**Call** (866) NJSMART

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Regional Outreach Manager

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