

# *LGEA Presentation*

## *Parsippany-Troy Hills Board of Education*

January 31, 2022

New Jersey's  
Clean Energy Program

*Lighting the way to New Jersey's Clean Energy Future*

# INTRODUCTIONS

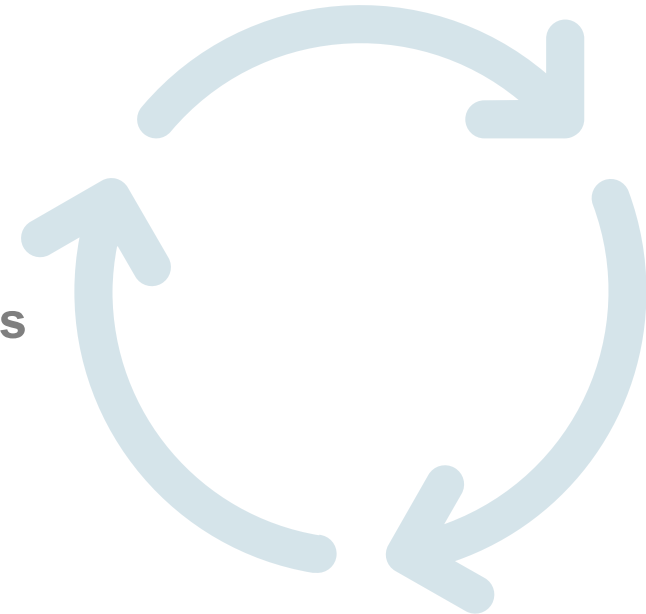
- *Parsippany-Troy Hills Board of Education*
  - Dan McDougal – Supervisor of Buildings & Grounds
  - Bill Crane – Operations Manager
  - Sue Dykstra – Comptroller
  - Robin Tedesco – Business Administrator / Board Secretary
- *NJ Clean Energy Program*
  - Sarah Walters – LGEA Project Manager
  - Moussa Traore – LGEA Lead Auditor
  - Ryan Knippenberg – LGEA Project Auditor
  - Arif Welcher – Government/Business Manager (BPU)

# AGENDA

- The audit process overview
- Energy use & existing conditions
- Review of **E**nergy **C**onservation **M**easures (ECMs) identified & other recommendations
- Energy Savings Improvement Program (ESIP)
- C&I Transition of EE Programs
- Questions regarding the draft audit report
- Next steps for Parsippany – Troy Hills Board of Education

# LGEA PROCESS

- Application Approval
- Initial Call
- Facility Interviews
- Audit
- Benchmarking & Analysis
- Draft Reports
- LGEA Presentation
- Final Reports



# SITE VISIT & UTILITY ANALYSIS

## Overview of Systems, Baseline & Existing Conditions:

- Lighting System
- HVAC and Mechanical Systems
- Plug Load Equipment
- Cooking & Refrigeration Equipment

## Utility Consumption:

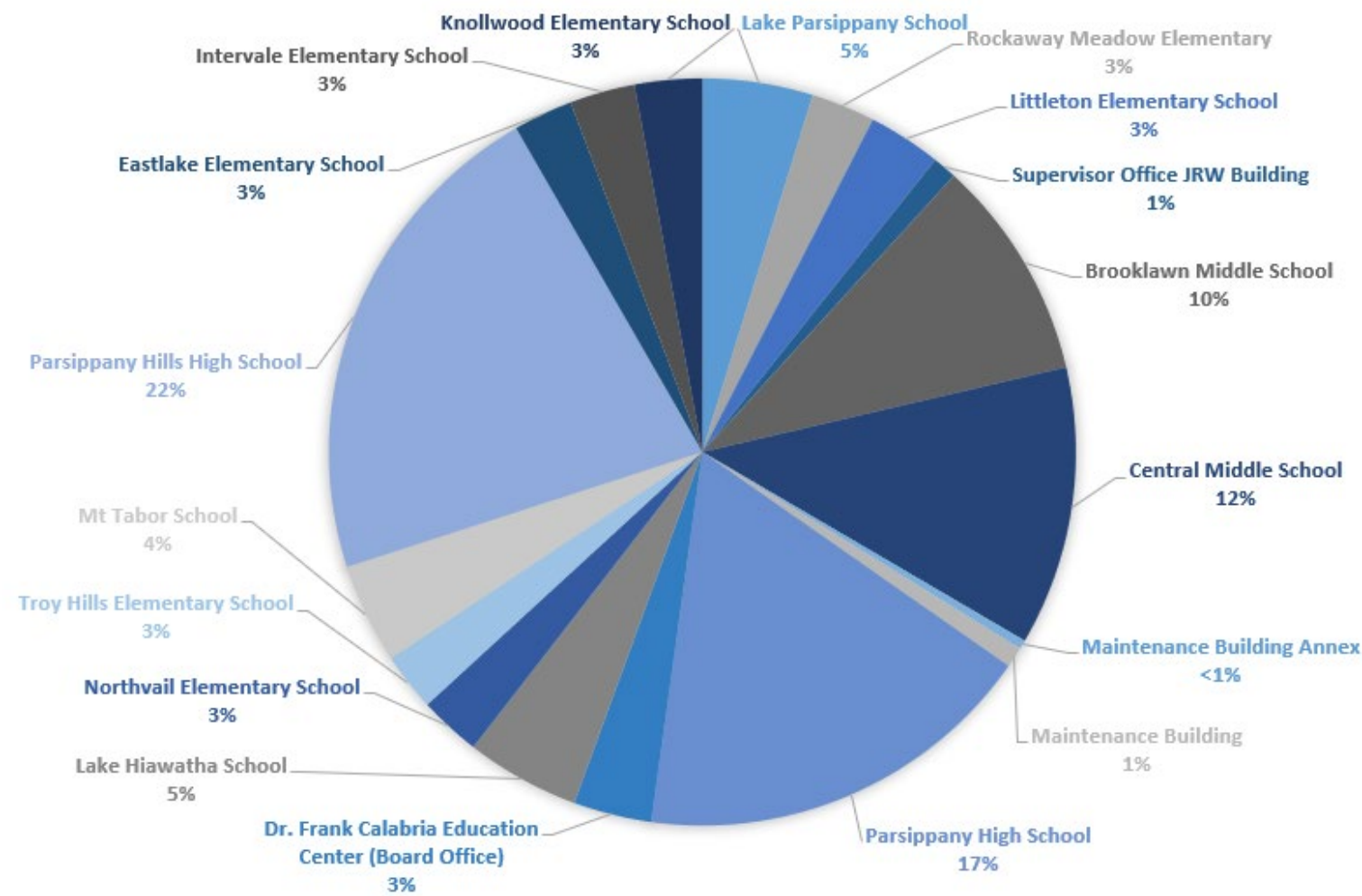
- Electric Consumption and Costs
- Natural Gas Consumption and Costs
- Solar Consumption and Costs

## Sites Visited/Analyzed

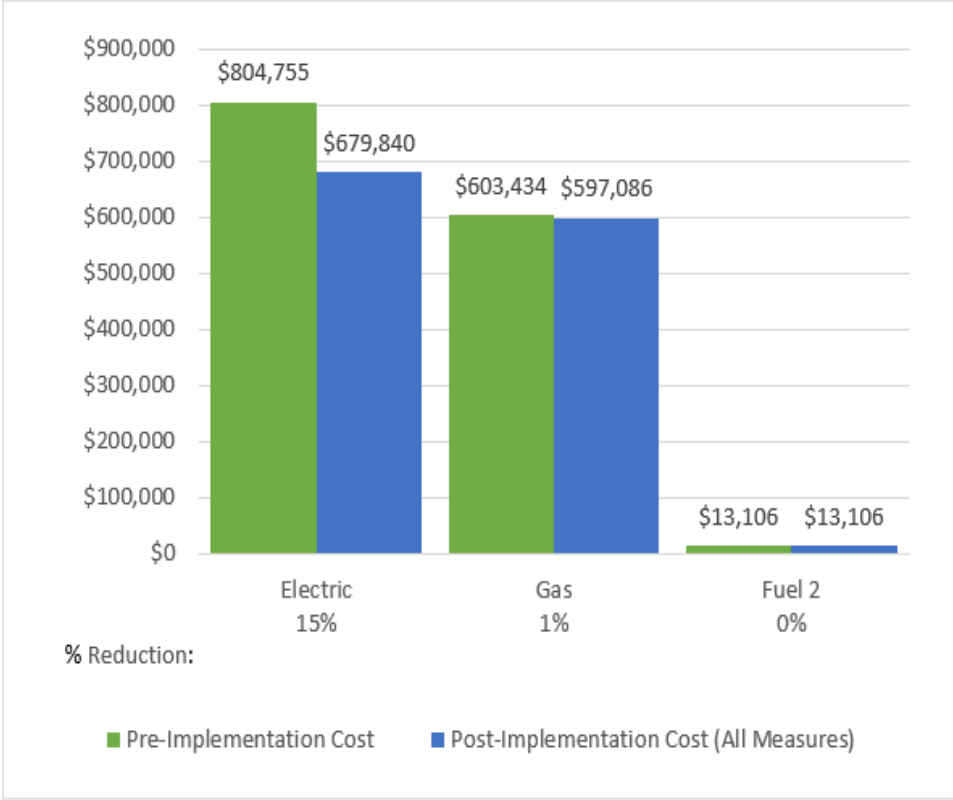
- Lake Parsippany School
- Rockaway Meadow Elementary
- Littleton Elementary School
- Supervisor's Office – JRW Building
- Brooklawn Middle School
- Central Middle School
- Maintenance Building Annex
- Maintenance Building
- Parsippany High School
- Dr. Frank Calabria Education Center
- Lake Hiawatha School
- Northvail Elementary School
- Troy Hills Elementary School
- Mt. Tabor School
- Parsippany Hills High School
- Eastlake Elementary School
- Intervale Elementary School
- Knollwood Elementary School

# UTILITY BREAKOUT


Percent of Total Annual Energy Costs



Pre & Post Implementation Cost



# BENCHMARKING


**ENERGY STAR® Statement of Energy Performance**  
LEARN MORE AT [energystar.gov](http://energystar.gov)

# 72

**ENERGY STAR® Score<sup>1</sup>**

**Brooklawn Middle School**

Primary Property Type: K-12 School  
 Gross Floor Area (ft²): 125,310  
 Built: 1967

For Year Ending: January 31, 2020  
 Date Generated: July 28, 2021

**Site EUI**  
64.9 kBtu/ft²

**Source EUI**  
95.5 kBtu/ft²

**National Median Comparison**

National Median Site EUI (kBtu/ft²)	83.1
National Median Source EUI (kBtu/ft²)	122.2
% Diff from National Median Source EUI	-22%

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**

<b>Property Address</b> Brooklawn Middle School 250 Beachwood Road Parsippany, New Jersey 07054	<b>Property Owner</b> Parsippany - Troy Hills Board of Education 292 Parsippany Road Parsippany, NJ 07054 (973) 263-7200	<b>Primary Contact</b> Dr. Alfred Savio 292 Parsippany Road Parsippany, NJ 07054 (973) 263-7200 x 7212 asavio@pthsd.net
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Property ID: 16057040

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

<b>Site EUI</b> 64.9 kBtu/ft²	<b>Annual Energy by Fuel</b>	<b>National Median Comparison</b>
	Natural Gas (kBtu) 5,609,284 (69%)	National Median Site EUI (kBtu/ft²) 83.1
	Electric - Grid (kBtu) 1,971,529 (24%)	National Median Source EUI (kBtu/ft²) 122.2
	Electric - Solar (kBtu) 556,518 (7%)	% Diff from National Median Source EUI -22%
<b>Source EUI</b> 95.5 kBtu/ft²	<b>Annual Emissions</b>	
	Greenhouse Gas Emissions (Metric Tons CO₂/year) 540	


**Signature & Stamp of Verifying Professional**

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

LP Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**



\_\_\_\_\_  
 ( ) \_\_\_\_\_



Professional Engineer or Registered Architect Stamp (if applicable)

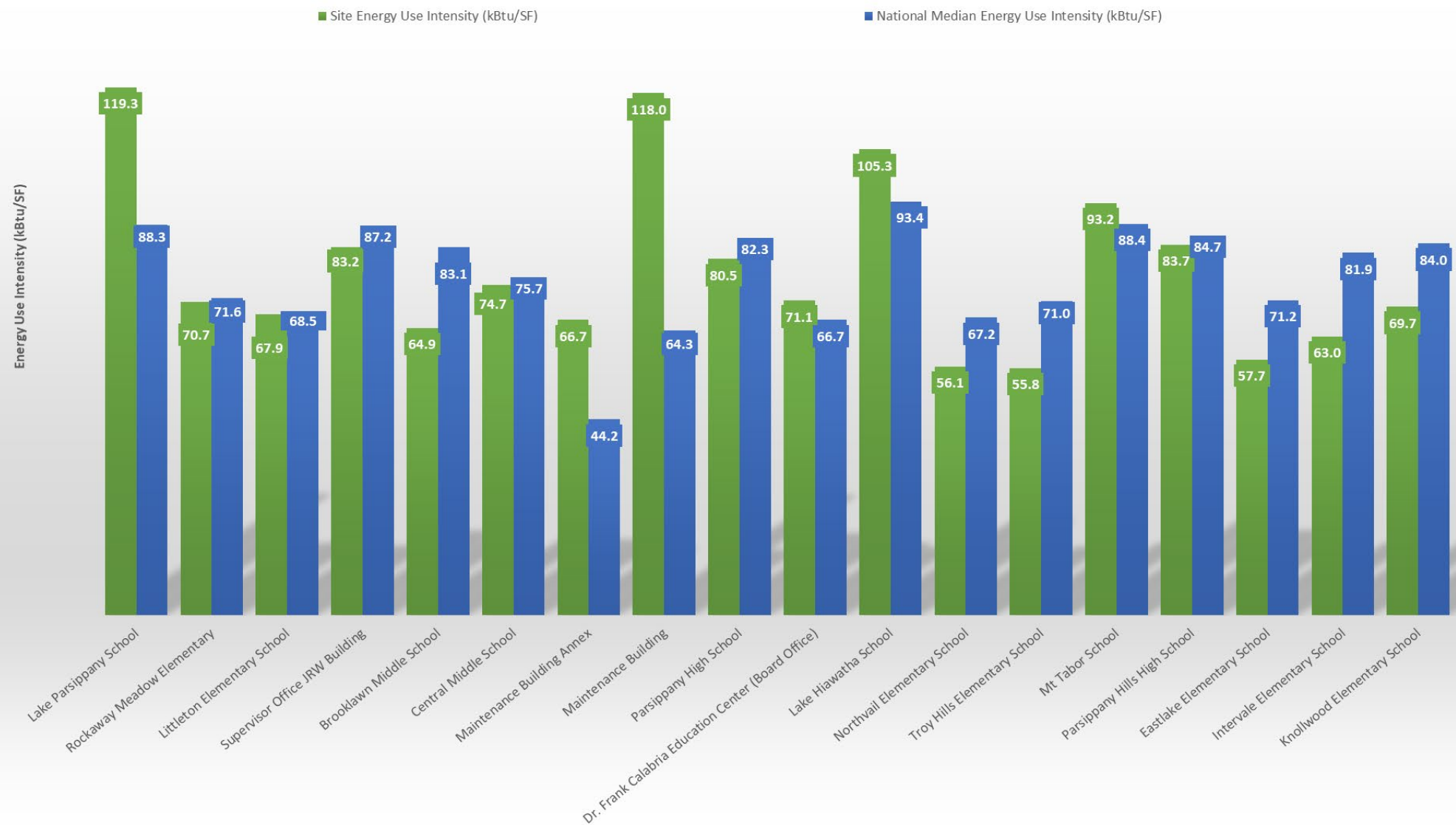
Site Name	ENERGY STAR® Score
Lake Parsippany School	21
Rockaway Meadow Elementary	51
Littleton Elementary School	50
Supervisor Office JRW Building	53
Brooklawn Middle School	72
Central Middle School	51
Maintenance Building Annex	N/A
Maintenance Building	N/A
Parsippany High School	52
Dr. Frank Calabria Education Center (Board Office)	44
Lake Hiawatha School	38
Parsippany - Troy Hills Board of Education	67
Troy Hills Elementary School	71
Mt Tabor School	44
Parsippany Hills High School	51
Eastlake Elementary School	69
Intervale Elementary School	73
Knollwood Elementary School	67

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.

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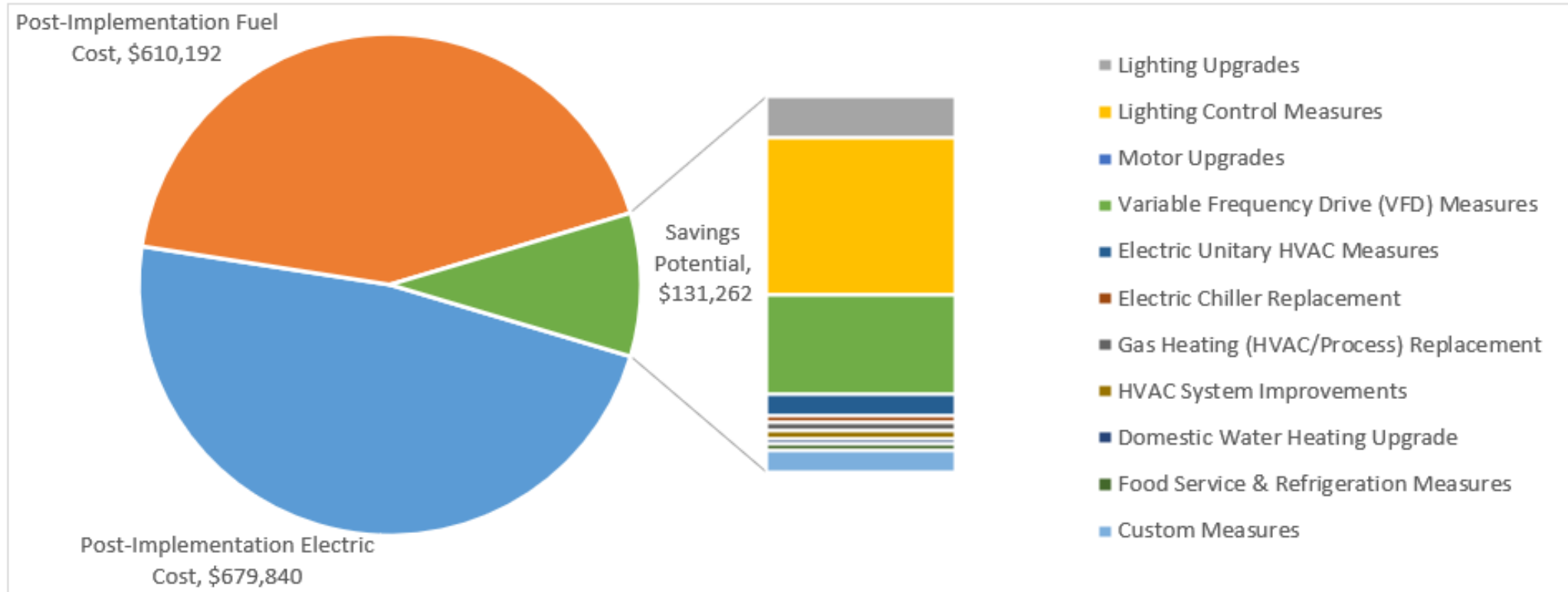
# BENCHMARKING





# 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 M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>126,263</b>	<b>29.0</b>	<b>-21.9</b>	<b>\$14,606</b>	<b>\$53,975</b>	<b>\$10,714</b>	<b>\$43,261</b>	<b>3.0</b>	<b>124,512</b>
ECM 1	Install LED Fixtures	16,308	0.5	-0.7	\$1,868	\$7,561	\$950	\$6,611	3.5	16,342
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	6,227	3.0	-1.4	\$739	\$4,808	\$576	\$4,232	5.7	6,093
ECM 3	Retrofit Fixtures with LED Lamps	103,593	25.5	-19.8	\$11,984	\$41,532	\$9,188	\$32,344	2.7	101,945
ECM 4	Install LED Exit Signs	135	0.0	0.0	\$15	\$72	\$0	\$72	5.0	133
<b>Lighting Control Measures</b>		<b>489,782</b>	<b>101.3</b>	<b>-102.8</b>	<b>\$54,420</b>	<b>\$359,199</b>	<b>\$96,980</b>	<b>\$262,219</b>	<b>4.8</b>	<b>481,141</b>
ECM 5	Install Occupancy Sensor Lighting Controls	406,324	87.9	-85.3	\$45,292	\$284,724	\$37,510	\$247,214	5.5	399,142
ECM 6	Install High/Low Lighting Controls	83,458	13.4	-17.5	\$9,128	\$74,475	\$59,470	\$15,005	1.6	81,999
<b>Motor Upgrades</b>		<b>421</b>	<b>0.1</b>	<b>0.0</b>	<b>\$46</b>	<b>\$1,824</b>	<b>\$0</b>	<b>\$1,824</b>	<b>39.8</b>	<b>424</b>
ECM 7	Premium Efficiency Motors	421	0.1	0.0	\$46	\$1,824	\$0	\$1,824	39.8	424
<b>Variable Frequency Drive (VFD) Measures</b>		<b>310,626</b>	<b>58.3</b>	<b>0.0</b>	<b>\$34,959</b>	<b>\$647,650</b>	<b>\$27,200</b>	<b>\$620,450</b>	<b>17.7</b>	<b>312,798</b>
ECM 8	Install VFDs on Constant Volume (CV) Fans	175,662	43.4	0.0	\$19,522	\$173,007	\$15,800	\$157,207	8.1	176,890
ECM 9	Install VFDs on Chilled Water Pumps	15,043	2.4	0.0	\$1,717	\$27,923	\$1,375	\$26,548	15.5	15,148
ECM 10	Install VFDs on Heating Water Pumps	119,922	12.5	0.0	\$13,721	\$446,721	\$10,025	\$436,696	31.8	120,760
<b>Electric Unitary HVAC Measures</b>		<b>63,239</b>	<b>46.4</b>	<b>10.8</b>	<b>\$7,221</b>	<b>\$328,791</b>	<b>\$25,956</b>	<b>\$302,835</b>	<b>41.9</b>	<b>64,950</b>
ECM 11	Install High Efficiency Air Conditioning Units	58,874	45.1	10.8	\$6,673	\$321,600	\$25,356	\$296,244	44.4	60,553
ECM 12	Install High Efficiency Heat Pumps	4,366	1.3	0.0	\$548	\$7,191	\$600	\$6,591	12.0	4,396
<b>Electric Chiller Replacement</b>		<b>21,828</b>	<b>16.6</b>	<b>0.0</b>	<b>\$2,611</b>	<b>\$116,880</b>	<b>\$2,400</b>	<b>\$114,480</b>	<b>43.9</b>	<b>21,981</b>
ECM 13	Install High Efficiency Chillers	21,828	16.6	0.0	\$2,611	\$116,880	\$2,400	\$114,480	43.9	21,981

# ALL OPPORTUNITIES

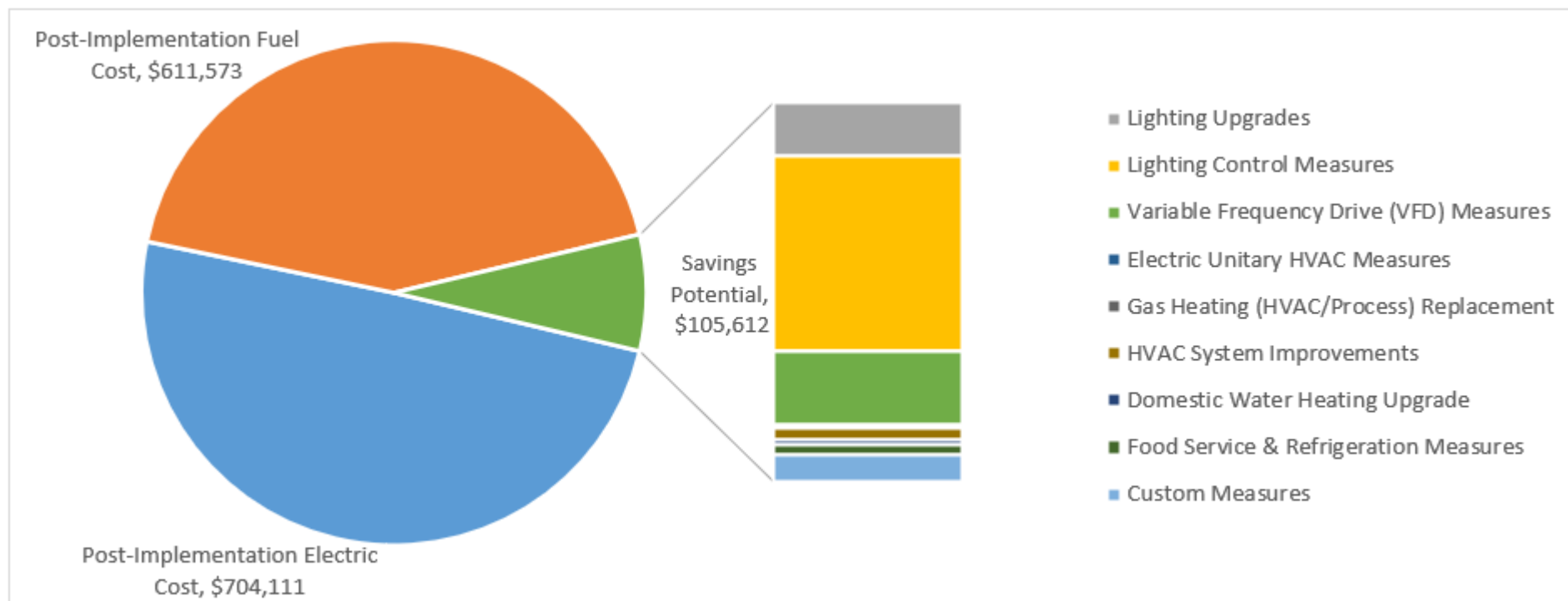
#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Gas Heating (HVAC/Process) Replacement</b>		<b>0</b>	<b>0.0</b>	<b>201.3</b>	<b>\$2,471</b>	<b>\$80,616</b>	<b>\$6,561</b>	<b>\$74,054</b>	<b>30.0</b>	<b>24,925</b>
ECM 14	Install High Efficiency Hot Water Boilers	0	0.0	172.3	\$1,911	\$64,905	\$6,043	\$58,862	30.8	20,178
ECM 15	Install High Efficiency Steam Boilers	0	0.0	29.0	\$561	\$15,711	\$518	\$15,192	27.1	4,747
<b>HVAC System Improvements</b>		<b>3,934</b>	<b>0.0</b>	<b>171.5</b>	<b>\$3,328</b>	<b>\$2,069</b>	<b>\$516</b>	<b>\$1,553</b>	<b>0.5</b>	<b>29,514</b>
ECM 16	Install Pipe Insulation	3,934	0.0	171.5	\$3,328	\$2,069	\$516	\$1,553	0.5	29,514
<b>Domestic Water Heating Upgrade</b>		<b>993</b>	<b>0.0</b>	<b>105.8</b>	<b>\$1,257</b>	<b>\$2,773</b>	<b>\$1,336</b>	<b>\$1,438</b>	<b>1.1</b>	<b>13,385</b>
ECM 17	Install Low-Flow DHW Devices	993	0.0	105.8	\$1,257	\$2,773	\$1,336	\$1,438	1.1	13,385
<b>Food Service &amp; Refrigeration Measures</b>		<b>25,331</b>	<b>2.6</b>	<b>0.0</b>	<b>\$2,805</b>	<b>\$11,475</b>	<b>\$1,380</b>	<b>\$10,095</b>	<b>3.6</b>	<b>25,508</b>
ECM 18	Refrigerator/Freezer Case Electrically Commutated Motors	3,426	0.4	0.0	\$375	\$3,640	\$480	\$3,160	8.4	3,450
ECM 19	Refrigeration Controls	2,744	0.0	0.0	\$298	\$4,385	\$250	\$4,135	13.9	2,764
ECM 20	Vending Machine Control	19,161	2.2	0.0	\$2,132	\$3,450	\$650	\$2,800	1.3	19,295
<b>Custom Measures</b>		<b>35,708</b>	<b>0.0</b>	<b>334.7</b>	<b>\$7,538</b>	<b>\$92,000</b>	<b>\$0</b>	<b>\$92,000</b>	<b>12.2</b>	<b>75,144</b>
ECM 21	Upgrade/Replace Energy Management System	35,708	0.0	334.7	\$7,538	\$92,000	\$0	\$92,000	12.2	75,144
<b>TOTALS</b>		<b>1,078,126</b>	<b>254.3</b>	<b>699.5</b>	<b>\$131,262</b>	<b>\$1,697,252</b>	<b>\$173,043</b>	<b>\$1,524,210</b>	<b>11.6</b>	<b>1,174,283</b>

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs

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

# 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 M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>		<b>126,239</b>	<b>29.0</b>	<b>-21.9</b>	<b>\$14,603</b>	<b>\$53,906</b>	<b>\$10,710</b>	<b>\$43,196</b>	<b>3.0</b>	<b>124,489</b>
ECM 1	Install LED Fixtures	16,308	0.5	-0.7	\$1,868	\$7,561	\$950	\$6,611	3.5	16,342
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	6,227	3.0	-1.4	\$739	\$4,808	\$576	\$4,232	5.7	6,093
ECM 3	Retrofit Fixtures with LED Lamps	103,569	25.4	-19.8	\$11,981	\$41,463	\$9,184	\$32,279	2.7	101,922
ECM 4	Install LED Exit Signs	135	0.0	0.0	\$15	\$72	\$0	\$72	5.0	133
<b>Lighting Control Measures</b>		<b>489,782</b>	<b>101.3</b>	<b>-102.8</b>	<b>\$54,420</b>	<b>\$359,199</b>	<b>\$96,980</b>	<b>\$262,219</b>	<b>4.8</b>	<b>481,141</b>
ECM 5	Install Occupancy Sensor Lighting Controls	406,324	87.9	-85.3	\$45,292	\$284,724	\$37,510	\$247,214	5.5	399,142
ECM 6	Install High/Low Lighting Controls	83,458	13.4	-17.5	\$9,128	\$74,475	\$59,470	\$15,005	1.6	81,999
<b>Variable Frequency Drive (VFD) Measures</b>		<b>185,648</b>	<b>42.3</b>	<b>0.0</b>	<b>\$20,509</b>	<b>\$175,232</b>	<b>\$17,750</b>	<b>\$157,482</b>	<b>7.7</b>	<b>186,946</b>
ECM 8	Install VFDs on Constant Volume (CV) Fans	153,051	37.9	0.0	\$16,709	\$129,118	\$13,950	\$115,168	6.9	154,121
ECM 9	Install VFDs on Chilled Water Pumps	14,053	2.2	0.0	\$1,599	\$23,413	\$1,300	\$22,113	13.8	14,151
ECM 10	Install VFDs on Heating Water Pumps	18,544	2.2	0.0	\$2,201	\$22,702	\$2,500	\$20,202	9.2	18,673
<b>Electric Unitary HVAC Measures</b>		<b>3,283</b>	<b>1.1</b>	<b>0.0</b>	<b>\$391</b>	<b>\$6,521</b>	<b>\$525</b>	<b>\$5,996</b>	<b>15.3</b>	<b>3,306</b>
ECM 11	Install High Efficiency Air Conditioning Units	3,283	1.1	0.0	\$391	\$6,521	\$525	\$5,996	15.3	3,306
<b>Gas Heating (HVAC/Process) Replacement</b>		<b>0</b>	<b>0.0</b>	<b>63.6</b>	<b>\$760</b>	<b>\$11,554</b>	<b>\$901</b>	<b>\$10,653</b>	<b>14.0</b>	<b>7,449</b>
ECM 14	Install High Efficiency Hot Water Boilers	0	0.0	63.6	\$760	\$11,554	\$901	\$10,653	14.0	7,449
<b>HVAC System Improvements</b>		<b>3,934</b>	<b>0.0</b>	<b>171.5</b>	<b>\$3,328</b>	<b>\$2,069</b>	<b>\$516</b>	<b>\$1,553</b>	<b>0.5</b>	<b>29,514</b>
ECM 16	Install Pipe Insulation	3,934	0.0	171.5	\$3,328	\$2,069	\$516	\$1,553	0.5	29,514
<b>Domestic Water Heating Upgrade</b>		<b>993</b>	<b>0.0</b>	<b>105.8</b>	<b>\$1,257</b>	<b>\$2,773</b>	<b>\$1,336</b>	<b>\$1,438</b>	<b>1.1</b>	<b>13,385</b>
ECM 17	Install Low-Flow DHW Devices	993	0.0	105.8	\$1,257	\$2,773	\$1,336	\$1,438	1.1	13,385
<b>Food Service &amp; Refrigeration Measures</b>		<b>25,331</b>	<b>2.6</b>	<b>0.0</b>	<b>\$2,805</b>	<b>\$11,475</b>	<b>\$1,380</b>	<b>\$10,095</b>	<b>3.6</b>	<b>25,508</b>
ECM 18	Refrigerator/Freezer Case Electrically Commutated Motors	3,426	0.4	0.0	\$375	\$3,640	\$480	\$3,160	8.4	3,450
ECM 19	Refrigeration Controls	2,744	0.0	0.0	\$298	\$4,385	\$250	\$4,135	13.9	2,764
ECM 20	Vending Machine Control	19,161	2.2	0.0	\$2,132	\$3,450	\$650	\$2,800	1.3	19,295
<b>Custom Measures</b>		<b>35,708</b>	<b>0.0</b>	<b>334.7</b>	<b>\$7,538</b>	<b>\$92,000</b>	<b>\$0</b>	<b>\$92,000</b>	<b>12.2</b>	<b>75,144</b>
ECM 21	Upgrade/Replace Energy Management System	35,708	0.0	334.7	\$7,538	\$92,000	\$0	\$92,000	12.2	75,144
<b>TOTALS</b>		<b>870,917</b>	<b>176.3</b>	<b>550.9</b>	<b>\$105,612</b>	<b>\$714,729</b>	<b>\$130,098</b>	<b>\$584,631</b>	<b>5.5</b>	<b>946,881</b>

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs

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

# PARSIPPANY HIGH SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			4,197	1.2	-1	\$448	\$2,632	\$360	\$2,272	5.1	4,134
ECM 1	Install LED Fixtures	Yes	432	0.0	0	\$47	\$525	\$100	\$425	9.1	435
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	281	0.2	0	\$30	\$271	\$36	\$235	7.8	276
ECM 3	Retrofit Fixtures with LED Lamps	Yes	3,483	1.0	-1	\$371	\$1,835	\$224	\$1,611	4.3	3,422
<b>Lighting Control Measures</b>			123,218	19.6	-26	\$13,120	\$66,656	\$24,880	\$41,776	3.2	121,063
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	101,425	16.2	-21	\$10,800	\$43,706	\$5,385	\$38,321	3.5	99,651
ECM 5	Install High/Low Lighting Controls	Yes	21,794	3.4	-5	\$2,321	\$22,950	\$19,495	\$3,455	1.5	21,413
<b>Motor Upgrades</b>			421	0.1	0	\$46	\$1,824	\$0	\$1,824	39.8	424
ECM 6	Premium Efficiency Motors	No	421	0.1	0	\$46	\$1,824	\$0	\$1,824	39.8	424
<b>Variable Frequency Drive (VFD) Measures</b>			40,782	9.8	0	\$4,433	\$32,532	\$3,200	\$29,332	6.6	41,067
ECM 7	Install VFDs on Constant Volume (CV) Fans	Yes	40,782	9.8	0	\$4,433	\$32,532	\$3,200	\$29,332	6.6	41,067
<b>Unitary HVAC Measures</b>			16,838	16.8	8	\$1,911	\$117,099	\$11,294	\$105,805	55.4	17,847
ECM 8	Install High Efficiency Air Conditioning Units	No	16,838	16.8	8	\$1,911	\$117,099	\$11,294	\$105,805	55.4	17,847
<b>HVAC System Improvements</b>			0	0.0	18	\$191	\$157	\$44	\$113	0.6	2,096
ECM 9	Install Pipe Insulation	Yes	0	0.0	18	\$191	\$157	\$44	\$113	0.6	2,096
<b>Domestic Water Heating Upgrade</b>			0	0.0	38	\$404	\$838	\$324	\$514	1.3	4,448
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	38	\$404	\$838	\$324	\$514	1.3	4,448
<b>Food Service &amp; Refrigeration Measures</b>			17,760	1.8	0	\$1,931	\$8,128	\$860	\$7,268	3.8	17,884
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,033	0.1	0	\$112	\$1,213	\$160	\$1,053	9.4	1,040
ECM 12	Refrigeration Controls	Yes	2,744	0.0	0	\$298	\$4,385	\$250	\$4,135	13.9	2,764
ECM 13	Vending Machine Control	Yes	13,983	1.6	0	\$1,520	\$2,530	\$450	\$2,080	1.4	14,080
<b>TOTALS</b>			203,217	49.3	37	\$22,484	\$229,866	\$40,962	\$188,905	8.4	208,964

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# PARSIPPANY HILLS HIGH SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			10,456	1.2	-2	\$1,152	\$2,153	\$399	\$1,754	1.5	10,305
ECM 1	Install LED Fixtures	Yes	3,257	0.5	-1	\$358	\$985	\$100	\$885	2.5	3,200
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,199	0.8	-1	\$794	\$1,168	\$299	\$869	1.1	7,105
<b>Lighting Control Measures</b>			99,704	16.7	-21	\$10,956	\$66,265	\$16,660	\$49,605	4.5	97,960
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	77,831	14.2	-16	\$8,552	\$52,540	\$6,475	\$46,065	5.4	76,470
ECM 4	Install High/Low Lighting Controls	Yes	21,873	2.5	-5	\$2,403	\$13,725	\$10,185	\$3,540	1.5	21,491
<b>Variable Frequency Drive (VFD) Measures</b>			144,899	21.3	0	\$16,253	\$416,784	\$12,275	\$404,509	24.9	145,913
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	50,672	11.2	0	\$5,684	\$37,894	\$5,075	\$32,819	5.8	51,026
ECM 6	Install VFDs on Chilled Water Pumps	Yes	12,278	1.9	0	\$1,377	\$20,152	\$1,100	\$19,052	13.8	12,363
ECM 7	Install VFDs on Heating Water Pumps	No	81,950	8.2	0	\$9,192	\$358,738	\$6,100	\$352,638	38.4	82,523
<b>Unitary HVAC Measures</b>			13,828	10.6	3	\$1,586	\$66,984	\$5,061	\$61,923	39.0	14,302
ECM 8	Install High Efficiency Air Conditioning Units	No	13,828	10.6	3	\$1,586	\$66,984	\$5,061	\$61,923	39.0	14,302
<b>HVAC System Improvements</b>			911	0.0	0	\$102	\$63	\$22	\$41	0.4	917
ECM 9	Install Pipe Insulation	Yes	911	0.0	0	\$102	\$63	\$22	\$41	0.4	917
<b>Domestic Water Heating Upgrade</b>			0	0.0	21	\$229	\$538	\$300	\$238	1.0	2,451
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	21	\$229	\$538	\$300	\$238	1.0	2,451
<b>Food Service &amp; Refrigeration Measures</b>			3,527	0.4	0	\$396	\$2,280	\$290	\$1,990	5.0	3,552
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,573	0.2	0	\$176	\$1,820	\$240	\$1,580	9.0	1,584
ECM 12	Vending Machine Control	Yes	1,954	0.2	0	\$219	\$460	\$50	\$410	1.9	1,968
<b>TOTALS</b>			273,325	50.3	1	\$30,673	\$555,066	\$35,007	\$520,060	17.0	275,399

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs

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



# BROOKLAWN MIDDLE SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			9,244	0.3	0	\$965	\$1,900	\$250	\$1,650	1.7	9,273
ECM 1	Install LED Fixtures	Yes	1,511	0.0	0	\$158	\$517	\$50	\$467	3.0	1,522
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	402	0.1	0	\$41	\$138	\$20	\$118	2.8	395
ECM 3	Retrofit Fixtures with LED Lamps	Yes	7,331	0.2	0	\$765	\$1,245	\$180	\$1,065	1.4	7,356
Lighting Control Measures			59,227	11.8	-12	\$6,072	\$41,385	\$11,065	\$30,320	5.0	58,191
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	44,359	9.5	-9	\$4,548	\$33,060	\$4,170	\$28,890	6.4	43,583
ECM 5	Install High/Low Lighting Controls	Yes	14,868	2.3	-3	\$1,524	\$8,325	\$6,895	\$1,430	0.9	14,608
Variable Frequency Drive (VFD) Measures			37,153	10.9	0	\$3,891	\$33,635	\$4,000	\$29,635	7.6	37,412
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	37,153	10.9	0	\$3,891	\$33,635	\$4,000	\$29,635	7.6	37,412
Unitary HVAC Measures			3,772	2.4	0	\$395	\$21,475	\$1,133	\$20,342	51.5	3,798
ECM 7	Install High Efficiency Air Conditioning Units	No	3,772	2.4	0	\$395	\$21,475	\$1,133	\$20,342	51.5	3,798
Domestic Water Heating Upgrade			0	0.0	19	\$200	\$702	\$312	\$390	1.9	2,222
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	19	\$200	\$702	\$312	\$390	1.9	2,222
Food Service & Refrigeration Measures			820	0.1	0	\$86	\$607	\$80	\$527	6.1	826
ECM 9	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	820	0.1	0	\$86	\$607	\$80	\$527	6.1	826
TOTALS			110,215	25.4	6	\$11,609	\$99,703	\$16,840	\$82,863	7.1	111,722

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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



# CENTRAL MIDDLE SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			4,009	0.3	0	\$438	\$1,828	\$302	\$1,526	3.5	3,980
ECM 1	Install LED Fixtures	Yes	964	0.0	0	\$106	\$471	\$50	\$421	4.0	970
ECM 2	Retrofit Fixtures with LED Lamps	Yes	2,910	0.3	0	\$317	\$1,284	\$252	\$1,032	3.3	2,877
ECM 3	Install LED Exit Signs	Yes	135	0.0	0	\$15	\$72	\$0	\$72	5.0	133
<b>Lighting Control Measures</b>			48,066	7.9	-10	\$5,204	\$29,237	\$8,555	\$20,682	4.0	47,226
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	39,902	6.7	-8	\$4,320	\$20,912	\$2,570	\$18,342	4.2	39,204
ECM 5	Install High/Low Lighting Controls	Yes	8,165	1.2	-2	\$884	\$8,325	\$5,985	\$2,340	2.6	8,022
<b>Variable Frequency Drive (VFD) Measures</b>			30,817	6.5	0	\$3,405	\$52,104	\$1,900	\$50,204	14.7	31,032
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	24,444	5.9	0	\$2,701	\$25,057	\$1,675	\$23,382	8.7	24,615
ECM 7	Install VFDs on Heating Water Pumps	No	6,373	0.6	0	\$704	\$27,047	\$225	\$26,822	38.1	6,417
<b>Unitary HVAC Measures</b>			18,900	12.6	0	\$2,089	\$90,801	\$5,880	\$84,921	40.7	19,032
ECM 8	Install High Efficiency Air Conditioning Units	No	18,900	12.6	0	\$2,089	\$90,801	\$5,880	\$84,921	40.7	19,032
<b>Gas Heating (HVAC/Process) Replacement</b>			0	0.0	89	\$955	\$40,787	\$3,182	\$37,606	39.4	10,414
ECM 9	Install High Efficiency Hot Water Boilers	No	0	0.0	89	\$955	\$40,787	\$3,182	\$37,606	39.4	10,414
<b>HVAC System Improvements</b>			0	0.0	20	\$218	\$230	\$64	\$166	0.8	2,377
ECM 10	Install Pipe Insulation	Yes	0	0.0	20	\$218	\$230	\$64	\$166	0.8	2,377
<b>Domestic Water Heating Upgrade</b>			0	0.0	11	\$117	\$280	\$156	\$124	1.1	1,274
ECM 11	Install Low-Flow DHW Devices	Yes	0	0.0	11	\$117	\$280	\$156	\$124	1.1	1,274
<b>Custom Measures</b>			35,708	0.0	335	\$7,538	\$92,000	\$0	\$92,000	12.2	75,144
ECM 12	Upgrade/Replace Energy Management System	Yes	35,708	0.0	335	\$7,538	\$92,000	\$0	\$92,000	12.2	75,144
<b>TOTALS</b>			137,500	27.4	444	\$19,963	\$307,267	\$20,039	\$287,228	14.4	190,479

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# EASTLAKE SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			14,879	3.6	-3	\$1,730	\$9,900	\$1,505	\$8,395	4.9	14,618
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	14,459	3.5	-3	\$1,681	\$9,450	\$1,225	\$8,225	4.9	14,206
ECM 2	Install High/Low Lighting Controls	Yes	420	0.1	0	\$49	\$450	\$280	\$170	3.5	412
HVAC System Improvements			0	0.0	8	\$91	\$72	\$20	\$52	0.6	928
ECM 3	Install Pipe Insulation	Yes	0	0.0	8	\$91	\$72	\$20	\$52	0.6	928
Domestic Water Heating Upgrade			0	0.0	6	\$65	\$86	\$48	\$38	0.6	667
ECM 4	Install Low-Flow DHW Devices	Yes	0	0.0	6	\$65	\$86	\$48	\$38	0.6	667
TOTALS			14,879	3.6	11	\$1,886	\$10,058	\$1,573	\$8,485	4.5	16,213

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# INTERVALE SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			882	0.0	0	\$104	\$594	\$104	\$490	4.7	888
ECM 1	Install LED Fixtures	Yes	858	0.0	0	\$101	\$525	\$100	\$425	4.2	864
ECM 2	Retrofit Fixtures with LED Lamps	No	24	0.0	0	\$3	\$69	\$4	\$65	23.7	23
<b>Lighting Control Measures</b>			10,017	3.1	-2	\$1,156	\$12,915	\$3,955	\$8,960	7.8	9,841
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	9,207	2.9	-2	\$1,062	\$9,990	\$1,295	\$8,695	8.2	9,046
ECM 4	Install High/Low Lighting Controls	Yes	810	0.3	0	\$93	\$2,925	\$2,660	\$265	2.8	795
<b>Variable Frequency Drive (VFD) Measures</b>			15,500	1.8	0	\$1,827	\$15,920	\$2,200	\$13,720	7.5	15,609
ECM 5	Install VFDs on Heating Water Pumps	Yes	15,500	1.8	0	\$1,827	\$15,920	\$2,200	\$13,720	7.5	15,609
<b>HVAC System Improvements</b>			0	0.0	3	\$31	\$35	\$12	\$23	0.7	308
ECM 6	Install Pipe Insulation	Yes	0	0.0	3	\$31	\$35	\$12	\$23	0.7	308
<b>Domestic Water Heating Upgrade</b>			0	0.0	4	\$49	\$108	\$60	\$48	1.0	490
ECM 7	Install Low-Flow DHW Devices	Yes	0	0.0	4	\$49	\$108	\$60	\$48	1.0	490
<b>TOTALS</b>			26,399	5.0	5	\$3,167	\$29,572	\$6,331	\$23,241	7.3	27,136

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# KNOLLWOOD SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			20,125	4.1	-4	\$2,256	\$12,716	\$2,960	\$9,756	4.3	19,773
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	15,346	3.6	-3	\$1,721	\$10,916	\$1,420	\$9,496	5.5	15,078
ECM 2	Install High/Low Lighting Controls	Yes	4,778	0.5	-1	\$536	\$1,800	\$1,540	\$260	0.5	4,695
Domestic Water Heating Upgrade			0	0.0	4	\$39	\$93	\$52	\$41	1.1	425
ECM 3	Install Low-Flow DHW Devices	Yes	0	0.0	4	\$39	\$93	\$52	\$41	1.1	425
TOTALS			20,125	4.1	-1	\$2,295	\$12,809	\$3,012	\$9,797	4.3	20,198

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# LAKE HIAWATHA SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			529	0.1	0	\$65	\$107	\$12	\$95	1.5	519
ECM 1	Retrofit Fixtures with LED Lamps	Yes	529	0.1	0	\$65	\$107	\$12	\$95	1.5	519
Lighting Control Measures			17,813	4.8	-4	\$2,196	\$22,345	\$6,865	\$15,480	7.0	17,501
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	14,368	3.9	-3	\$1,772	\$17,170	\$2,325	\$14,845	8.4	14,117
ECM 3	Install High/Low Lighting Controls	Yes	3,445	0.9	-1	\$425	\$5,175	\$4,540	\$635	1.5	3,385
Variable Frequency Drive (VFD) Measures			6,087	0.7	0	\$764	\$13,562	\$600	\$12,962	17.0	6,129
ECM 4	Install VFDs on Heating Water Pumps	No	6,087	0.7	0	\$764	\$13,562	\$600	\$12,962	17.0	6,129
Unitary HVAC Measures			4,366	1.3	0	\$548	\$7,191	\$600	\$6,591	12.0	4,396
ECM 5	Install High Efficiency Heat Pumps	No	4,366	1.3	0	\$548	\$7,191	\$600	\$6,591	12.0	4,396
TOTALS			28,793	7.0	-4	\$3,573	\$43,205	\$8,077	\$35,128	9.8	28,546

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# LAKE PARSIPPANY SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			9,237	2.7	-2	\$1,027	\$9,949	\$1,405	\$8,544	8.3	9,076
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	8,717	2.7	-2	\$969	\$9,724	\$1,195	\$8,529	8.8	8,565
ECM 2	Install High/Low Lighting Controls	Yes	520	0.1	0	\$58	\$225	\$210	\$15	0.3	511
TOTALS			9,237	2.7	-2	\$1,027	\$9,949	\$1,405	\$8,544	8.3	9,076

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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



# LITTLETON SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Control Measures</b>			13,433	4.6	-3	\$1,762	\$13,398	\$2,195	\$11,203	6.4	13,198
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	13,081	4.5	-3	\$1,716	\$12,498	\$1,635	\$10,863	6.3	12,852
ECM 2	Install High/Low Lighting Controls	Yes	352	0.1	0	\$46	\$900	\$560	\$340	7.4	346
<b>Variable Frequency Drive (VFD) Measures</b>			9,265	2.7	0	\$1,237	\$20,569	\$1,400	\$19,169	15.5	9,330
ECM 3	Install VFDs on Constant Volume (CV) Fans	No	7,500	2.4	0	\$1,001	\$13,788	\$1,100	\$12,688	12.7	7,552
ECM 4	Install VFDs on Heating Water Pumps	No	1,766	0.3	0	\$236	\$6,781	\$300	\$6,481	27.5	1,778
<b>Unitary HVAC Measures</b>			2,253	1.5	0	\$301	\$18,721	\$1,464	\$17,257	57.4	2,269
ECM 5	Install High Efficiency Air Conditioning Units	No	2,253	1.5	0	\$301	\$18,721	\$1,464	\$17,257	57.4	2,269
<b>Domestic Water Heating Upgrade</b>			0	0.0	2	\$19	\$29	\$26	\$3	0.2	199
ECM 6	Install Low-Flow DHW Devices	Yes	0	0.0	2	\$19	\$29	\$26	\$3	0.2	199
<b>TOTALS</b>			24,951	8.8	-1	\$3,319	\$52,717	\$5,084	\$47,633	14.4	24,996

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# Mt. TABOR SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			670	0.2	0	\$81	\$1,530	\$121	\$1,409	17.3	663
ECM 1	Retrofit Fixtures with LED Lamps	Yes	670	0.2	0	\$81	\$1,530	\$121	\$1,409	17.3	663
Lighting Control Measures			12,035	4.1	-3	\$1,452	\$16,805	\$5,160	\$11,645	8.0	11,825
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	9,473	3.2	-2	\$1,143	\$12,530	\$1,730	\$10,800	9.4	9,308
ECM 3	Install High/Low Lighting Controls	Yes	2,562	0.9	-1	\$309	\$4,275	\$3,430	\$845	2.7	2,517
Variable Frequency Drive (VFD) Measures			3,043	0.4	0	\$374	\$6,781	\$300	\$6,481	17.3	3,065
ECM 4	Install VFDs on Heating Water Pumps	Yes	3,043	0.4	0	\$374	\$6,781	\$300	\$6,481	17.3	3,065
HVAC System Improvements			1,591	0.0	5	\$254	\$156	\$108	\$48	0.2	2,219
ECM 5	Install Pipe Insulation	Yes	1,591	0.0	5	\$254	\$156	\$108	\$48	0.2	2,219
TOTALS			17,339	4.6	3	\$2,161	\$25,272	\$5,689	\$19,583	9.1	17,771

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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



# NORTHVAIL SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			11,612	3.3	-2	\$1,452	\$10,136	\$1,505	\$8,631	5.9	11,409
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	11,416	3.3	-2	\$1,428	\$9,686	\$1,295	\$8,391	5.9	11,216
ECM 2	Install High/Low Lighting Controls	Yes	196	0.1	0	\$25	\$450	\$210	\$240	9.8	192
Variable Frequency Drive (VFD) Measures			1,332	0.4	0	\$170	\$3,391	\$150	\$3,241	19.1	1,341
ECM 3	Install VFDs on Constant Volume (CV) Fans	No	1,332	0.4	0	\$170	\$3,391	\$150	\$3,241	19.1	1,341
TOTALS			12,943	3.8	-2	\$1,622	\$13,527	\$1,655	\$11,872	7.3	12,750

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# ROCKAWAY MEADOW SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			11,094	2.8	-2	\$1,271	\$10,631	\$3,045	\$7,586	6.0	10,900
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	10,790	2.8	-2	\$1,236	\$10,406	\$2,820	\$7,586	6.1	10,601
ECM 2	Install High/Low Lighting Controls	Yes	305	0.0	0	\$35	\$225	\$225	\$0	0.0	299
TOTALS			11,094	2.8	-2	\$1,271	\$10,631	\$3,045	\$7,586	6.0	10,900

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# TROY HILLS SCHOOL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Control Measures			11,867	4.0	-2	\$1,554	\$13,206	\$3,285	\$9,921	6.4	11,659
ECM 1	Install Occupancy Sensor Lighting Controls	Yes	9,930	3.4	-2	\$1,300	\$10,956	\$1,430	\$9,526	7.3	9,756
ECM 2	Install High/Low Lighting Controls	Yes	1,937	0.7	0	\$254	\$2,250	\$1,855	\$395	1.6	1,903
TOTALS			11,867	4.0	-2	\$1,554	\$13,206	\$3,285	\$9,921	6.4	11,659

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# DR. FRANK CALABRIA EDUCATION CENTER

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			67,284	17.1	-14	\$7,851	\$25,893	\$5,941	\$19,952	2.5	66,137
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	65	0.1	0	\$8	\$69	\$10	\$59	7.8	64
ECM 2	Retrofit Fixtures with LED Lamps	Yes	67,219	17.0	-14	\$7,844	\$25,824	\$5,931	\$19,893	2.5	66,073
Lighting Control Measures			20,288	5.2	-4	\$2,366	\$14,665	\$2,900	\$11,765	5.0	19,933
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	18,853	4.9	-4	\$2,199	\$12,190	\$1,500	\$10,690	4.9	18,523
ECM 4	Install High/Low Lighting Controls	Yes	1,435	0.3	0	\$167	\$2,475	\$1,400	\$1,075	6.4	1,410
Variable Frequency Drive (VFD) Measures			19,276	3.2	0	\$2,297	\$46,354	\$875	\$45,479	19.8	19,410
ECM 5	Install VFDs on Constant Volume (CV) Fans	No	13,780	2.7	0	\$1,642	\$26,710	\$600	\$26,110	15.9	13,876
ECM 6	Install VFDs on Chilled Water Pumps	No	990	0.2	0	\$118	\$4,510	\$75	\$4,435	37.6	997
ECM 7	Install VFDs on Heating Water Pumps	No	4,506	0.3	0	\$537	\$15,134	\$200	\$14,934	27.8	4,538
Unitary HVAC Measures			3,283	1.1	0	\$391	\$6,521	\$525	\$5,996	15.3	3,306
ECM 8	Install High Efficiency Air Conditioning Units	Yes	3,283	1.1	0	\$391	\$6,521	\$525	\$5,996	15.3	3,306
Electric Chiller Replacement			20,048	13.4	0	\$2,388	\$68,753	\$1,000	\$67,753	28.4	20,188
ECM 9	Install High Efficiency Chillers	No	20,048	13.4	0	\$2,388	\$68,753	\$1,000	\$67,753	28.4	20,188
Gas Heating (HVAC/Process) Replacement			0	0.0	64	\$760	\$11,554	\$901	\$10,653	14.0	7,449
ECM 10	Install High Efficiency Hot Water Boilers	Yes	0	0.0	64	\$760	\$11,554	\$901	\$10,653	14.0	7,449
HVAC System Improvements			1,130	0.0	0	\$135	\$92	\$32	\$60	0.4	1,138
ECM 11	Install Pipe Insulation	Yes	1,130	0.0	0	\$135	\$92	\$32	\$60	0.4	1,138
Domestic Water Heating Upgrade			777	0.0	0	\$93	\$43	\$22	\$21	0.2	782
ECM 12	Install Low-Flow DHW Devices	Yes	777	0.0	0	\$93	\$43	\$22	\$21	0.2	782
Food Service & Refrigeration Measures			1,612	0.2	0	\$192	\$230	\$50	\$180	0.9	1,623
ECM 13	Vending Machine Control	Yes	1,612	0.2	0	\$192	\$230	\$50	\$180	0.9	1,623
TOTALS			133,696	40.3	46	\$16,473	\$174,106	\$12,246	\$161,859	9.8	139,966

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# SUPERVISOR'S OFFICE – JRW BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
<b>Lighting Upgrades</b>			21,308	6.4	-3	\$2,628	\$12,337	\$2,167	\$10,170	3.9	21,104
ECM 1	Install LED Fixtures	Yes	4,818	0.0	0	\$601	\$2,587	\$250	\$2,337	3.9	4,852
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	4,896	2.5	-1	\$601	\$4,056	\$470	\$3,586	6.0	4,810
ECM 3	Retrofit Fixtures with LED Lamps	Yes	11,594	3.9	-2	\$1,426	\$5,693	\$1,447	\$4,246	3.0	11,442
<b>Lighting Control Measures</b>			5,450	2.2	-1	\$668	\$7,100	\$970	\$6,130	9.2	5,354
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	5,450	2.2	-1	\$668	\$7,100	\$970	\$6,130	9.2	5,354
<b>Variable Frequency Drive (VFD) Measures</b>			2,473	0.4	0	\$308	\$6,017	\$300	\$5,717	18.5	2,490
ECM 5	Install VFDs on Chilled Water Pumps	Yes	1,776	0.4	0	\$221	\$3,261	\$200	\$3,061	13.8	1,788
ECM 6	Install VFDs on Heating Water Pumps	No	697	0.1	0	\$87	\$2,756	\$100	\$2,656	30.5	702
<b>Electric Chiller Replacement</b>			1,781	3.2	0	\$222	\$48,127	\$1,400	\$46,727	210.4	1,793
ECM 7	Install High Efficiency Chillers	No	1,781	3.2	0	\$222	\$48,127	\$1,400	\$46,727	210.4	1,793
<b>Gas Heating (HVAC/Process) Replacement</b>			0	0.0	20	\$196	\$12,564	\$1,960	\$10,604	54.0	2,316
ECM 8	Install High Efficiency Hot Water Boilers	No	0	0.0	20	\$196	\$12,564	\$1,960	\$10,604	54.0	2,316
<b>Domestic Water Heating Upgrade</b>			0	0.0	2	\$18	\$36	\$26	\$10	0.5	209
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	2	\$18	\$36	\$26	\$10	0.5	209
<b>Food Service &amp; Refrigeration Measures</b>			1,612	0.2	0	\$201	\$230	\$100	\$130	0.6	1,623
ECM 10	Vending Machine Control	Yes	1,612	0.2	0	\$201	\$230	\$100	\$130	0.6	1,623
<b>TOTALS</b>			32,623	12.4	17	\$4,242	\$86,411	\$6,923	\$79,487	18.7	34,890

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# MAINTENANCE BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			6,453	0.8	-1	\$701	\$3,036	\$542	\$2,494	3.6	6,363
ECM 1	Install LED Fixtures	Yes	4,468	0.0	0	\$497	\$1,950	\$300	\$1,650	3.3	4,499
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	582	0.2	0	\$60	\$275	\$40	\$235	3.9	547
ECM 3	Retrofit Fixtures with LED Lamps	Yes	1,403	0.6	-1	\$145	\$810	\$202	\$608	4.2	1,317
Lighting Control Measures			1,718	0.5	-1	\$177	\$1,890	\$70	\$1,820	10.3	1,613
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,718	0.5	-1	\$177	\$1,890	\$70	\$1,820	10.3	1,613
Gas Heating (HVAC/Process) Replacement			0	0.0	29	\$561	\$15,711	\$518	\$15,192	27.1	4,747
ECM 5	Install High Efficiency Steam Boilers	No	0	0.0	29	\$561	\$15,711	\$518	\$15,192	27.1	4,747
HVAC System Improvements			286	0.0	114	\$2,239	\$1,164	\$190	\$974	0.4	18,979
ECM 6	Install Pipe Insulation	Yes	286	0.0	114	\$2,239	\$1,164	\$190	\$974	0.4	18,979
Domestic Water Heating Upgrade			216	0.0	0	\$24	\$22	\$10	\$12	0.5	217
ECM 7	Install Low-Flow DHW Devices	Yes	216	0.0	0	\$24	\$22	\$10	\$12	0.5	217
TOTALS			8,673	1.4	142	\$3,702	\$21,822	\$1,330	\$20,492	5.5	31,918

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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





# MAINTENANCE BUILDING ANNEX

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated M&L Cost (\$)	Estimated Incentive (\$)*	Estimated Net M&L Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (lbs)
Lighting Upgrades			1,231	1.3	-1	\$173	\$1,966	\$516	\$1,450	8.4	1,147
ECM 1	Retrofit Fixtures with LED Lamps	Yes	1,231	1.3	-1	\$173	\$1,966	\$516	\$1,450	8.4	1,147
HVAC System Improvements			17	0.0	3	\$68	\$99	\$24	\$75	1.1	553
ECM 2	Install Pipe Insulation	Yes	17	0.0	3	\$68	\$99	\$24	\$75	1.1	553
TOTALS			1,248	1.3	3	\$241	\$2,065	\$540	\$1,525	6.3	1,700

\* - All incentives presented in this table are included as placeholders and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

# 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***



# MEASURES FOR FUTURE CONSIDERATION

- Upgrade/Replace Energy Management System
- Install High Efficiency Energy Recovery Units (ERUs)
- Evaluate CHP Operations
- Window Replacements
- Retro-Commissioning Study



# SOLAR ENERGY GENERATION POTENTIAL

	Parsippany HS	Parsippany Hills HS	Brooklawn MS	Central MS	Eastlake	Knollwood	Lake Hiawatha	Lake Parsippany	Littleton	Mt Tabor	Northvail	Rockaway	Troy Hills ES
<i>Potential:</i>	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
<i>System Potential: (kW)</i>	384	388	113	80	59	72	87	73	120	72	66	65	61
<i>Electric Generation: (kWh per year)</i>	457,486	462,252	134,625	95,310	70,291	85,778	103,649	86,970	90,293	85,778	78,631	77,439	72,674
<i>Displaced Cost: (per year)</i>	\$49,730	\$51,850	\$14,100	\$10,530	\$8,340	\$9,810	\$13,010	\$9,870	\$12,050	\$10,550	\$10,010	\$9,050	\$9,650

## Successor Solar Incentive Program

<https://www.njcleanenergy.com/renewable-energy/programs/susi-program>

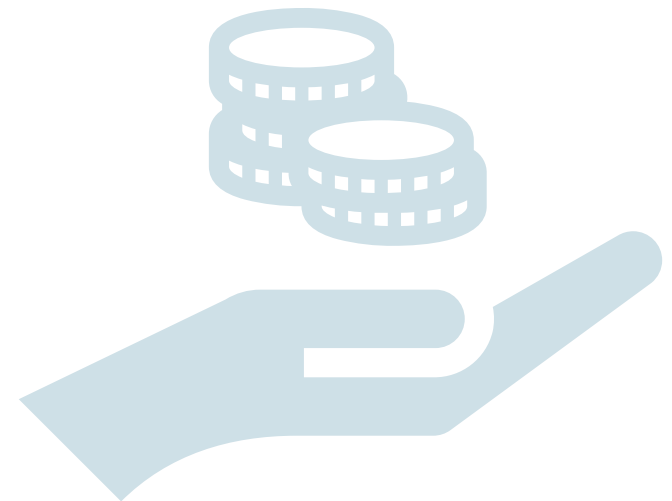
## Community Solar Energy Pilot Program

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

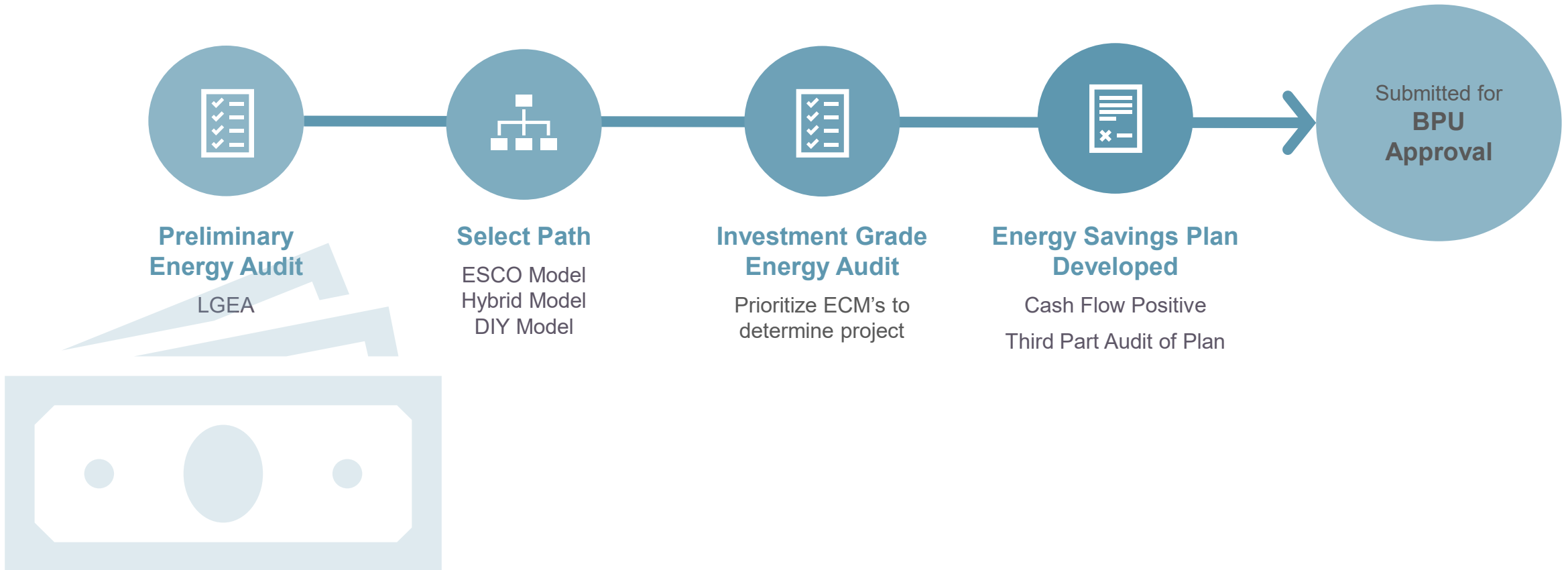
# FINANCING MECHANISM: ESIP

## ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

- Energy Performance Contracting – NJ ESIP
- Financing Mechanism that allows state entities to make energy efficiency improvements without impacting their budgets
- Administered by the NJBPU
- Project is paid for with the value of its own energy savings
- 15 or 20 year self-funding loan
- Recent Energy Efficiency Transition
  - NJBPU Approved Incentive Programs
    - Utility or NJCEP
- Can be combined with Federal/State Pandemic Relief Funds
- No upfront capital expenses
- No referendum or impact to tax payers



# FINANCING MECHANISM: ESIP



# ENERGY SAVINGS IMPROVEMENT PROGRAM

## FOR MORE INFORMATION

### **Michelle Rossi**

ESIP Coordinator

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

o: 609.633.9641

c: 609.915.0903

### **Arif Welcher**

Government/Business Manager

[arif.welcher@bpu.nj.gov](mailto:arif.welcher@bpu.nj.gov)

o: 609.633.9703

c: 609.815.6088

# C&I TRANSITION OF ENERGY EFFICIENCY PROGRAMS

<https://www.njcleanenergy.com/transition>

LOCAL  
GOVERNMENT  
CUSTOMERS

COMMERCIAL &  
INSTITUTIONAL  
CUSTOMERS

LARGE  
ENERGY  
CUSTOMERS

## EXISTING BUILDINGS

### MEASUREMENT & AUDITS

FREE Energy Audits



### RETROFITS

Prescriptive &  
Custom Rebates

Direct Install

Engineered Solutions

And more from  
your local utility!



Incentives up  
to \$4 million  
for eligible projects



## NEW CONSTRUCTION

Prescriptive & Custom  
Rebates for New  
Construction and  
Gut Rehabs

Pay for Performance  
incentives for  
buildings over  
50,000 sq. ft.



## DISTRIBUTED ENERGY RESOURCES

Combined Heat & Power  
and Fuel Cell Installation  
Incentives

Microgrid Development

Battery Storage

Muni EV Fleets



Key:

Programs run by investor-owned utility companies



Programs run by NJCEP



# UTILITY RUN ENERGY EFFICIENCY PROGRAMS

## **PRESCRIPTIVE & CUSTOM REBATES:**

- Individual high efficiency equipment rebates for renovation, remodeling, and equipment replacement
- Flexibility to do a little or a lot
- No size requirement

## **DIRECT INSTALL:**

- Turn-key retrofit program to replace outdated and inefficient equipment including, lighting, HVAC, refrigeration, etc.
- The facility must have an average electric peak demand <200kW in the previous year to qualify

## **ENGINEERED SOLUTIONS:**

- Comprehensive, whole-building approach to saving energy
- The facility must have an average electric peak demand >200kW in the previous year to qualify



# SCHOOL & SMALL BUSINESS ENERGY EFFICIENCY STIMULUS PROGRAM

[NJCleanEnergy.com/SSBEE](http://NJCleanEnergy.com/SSBEE)

## ABOUT

Provides grants to ensure facilities have functional HVAC systems that are tested, adjusted, and, if necessary or cost effective, repaired, upgraded or replaced to improve performance. (*SSB-VEEVR*)

Provides grants to replace noncompliant plumbing fixtures and appliances that fail to meet water efficiency standards. (*SSB-NPFA*)

## REQUIREMENTS

Assessment verified by a Certified Energy Auditor or TAB Technician and proof of noncompliant equipment.

## INCENTIVE CAP

Grants shall provide no more than 75% of the approved project cost up to \$5 million.





# FOR MORE INFORMATION

**Sarah Walters – LGEA Project Manager**

[SWalters@trccompanies.com](mailto:SWalters@trccompanies.com)

(732) 589-7372

**Moussa Traore – LGEA Lead Energy Auditor**

[MTraore@trccompanies.com](mailto:MTraore@trccompanies.com)

(732) 902-1797

**Ryan Knippenberg – LGEA Energy Auditor**

[RKnippenberg@trccompanies.com](mailto:RKnippenberg@trccompanies.com)

(732) 439-7184

THANK YOU

