

New Jersey's Clean Energy Program

LGEA Exit Meeting for:
Marlboro Township Board of Education

Smruti Srinivasan, TRC

July 26, 2018

Introductions

- Marlboro Township BOE
 - Michael Crivelli – Supervisor of Buildings & Grounds
 - Cindy Barr-Rague – School Business Administrator
- NJ Clean Energy Program
 - Brian DeLuca – Program Manager
 - Smruti Srinivasan – Auditor
 - Elizabeth Ebinger – Account Manager
 - 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 Marlboro Township BOE

Process



Site Visit and Utility Analysis

Overview of Systems, Baseline & Existing Conditions:

- Building Envelope
- Lighting System
- HVAC and Mechanical Systems

Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs
- Fuel Oil Consumption and Costs

Sites Visited/Analyzed

- Administration Building
- Annex- Building and Grounds
- Asher Holmes Elementary School
- David C Abbott Early Learning Center
- Frank Defino Central School
- Frank J. Dugan Elementary School
- Marlboro Elementary School
- Marlboro Memorial Middle School
- Marlboro Middle School
- Robertsville Elementary School
- Transportation Building

All Opportunities



Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades	1,058,096	268.4	0.0	\$138,266.58	\$1,035,237.91	\$150,000.00	\$885,237.91	6.4	1,065,494
Install LED Fixtures	191,447	32.4	0.0	\$25,269.79	\$272,832.25	\$26,745.00	\$246,087.25	9.7	192,785
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,764	0.5	0.0	\$220.26	\$2,144.00	\$130.00	\$2,014.00	9.1	1,776
Retrofit Fixtures with LED Lamps	829,222	233.2	0.0	\$108,074.09	\$736,922.21	\$123,125.00	\$613,797.21	5.7	835,020
Install LED Exit Signs	35,663	2.3	0.0	\$4,702.44	\$23,339.45	\$0.00	\$23,339.45	5.0	35,912
Lighting Control Measures	226,744	63.5	0.0	\$29,584.44	\$320,526.00	\$38,286.00	\$282,240.00	9.5	228,329
Install Occupancy Sensor Lighting Controls	210,025	59.3	0.0	\$27,387.24	\$291,196.00	\$37,650.00	\$253,546.00	9.3	211,494
Install Daylight Dimming Controls	3,386	0.4	0.0	\$447.89	\$1,464.00	\$636.00	\$828.00	1.8	3,410
Install High/Low Lighting Controls	13,332	3.7	0.0	\$1,749.31	\$27,866.00	\$0.00	\$27,866.00	15.9	13,425
Motor Upgrades	14,020	4.3	0.0	\$1,800.81	\$39,698.40	\$0.00	\$39,698.40	22.0	14,118
Premium Efficiency Motors	14,020	4.3	0.0	\$1,800.81	\$39,698.40	\$0.00	\$39,698.40	22.0	14,118
Variable Frequency Drive (VFD) Measures	305,798	78.3	0.0	\$39,977.11	\$228,345.79	\$30,900.00	\$197,445.79	4.9	307,936
Install VFDs on Constant Volume (CV) HVAC	51,570	15.6	0.0	\$6,563.61	\$56,317.90	\$8,400.00	\$47,917.90	7.3	51,931
Install VFDs on Chilled Water Pumps	133,090	41.5	0.0	\$17,754.81	\$93,943.10	\$22,500.00	\$71,443.10	4.0	134,021
Install VFDs on Hot Water Pumps	121,138	21.3	0.0	\$15,658.69	\$78,084.79	\$0.00	\$78,084.79	5.0	121,985
Electric Unitary HVAC Measures	102,382	27.7	0.0	\$13,259.15	\$462,659.52	\$25,662.00	\$436,997.52	33.0	103,098
Install High Efficiency Electric AC	53,485	21.8	0.0	\$7,016.77	\$419,549.28	\$23,914.00	\$395,635.28	56.4	53,859
Install High Efficiency Heat Pumps	48,897	5.9	0.0	\$6,242.38	\$43,110.24	\$1,748.00	\$41,362.24	6.6	49,239
Electric Chiller Replacement	176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
Install High Efficiency Chillers	176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
Gas Heating (HVAC/Process) Replacement	0	0.0	1,053.7	\$11,566.23	\$605,635.39	\$11,508.08	\$594,127.31	51.4	123,380
Install High Efficiency Hot Water Boilers	0	0.0	1,008.4	\$11,063.69	\$597,569.38	\$9,908.08	\$587,661.30	53.1	118,067
Install High Efficiency Furnaces	0	0.0	45.4	\$502.54	\$8,066.01	\$1,600.00	\$6,466.01	12.9	5,313
HVAC System Improvements	9,418	0.0	5.6	\$1,305.68	\$2,718.84	\$0.00	\$2,718.84	2.1	10,142
Implement Demand Control Ventilation	9,418	0.0	5.6	\$1,305.68	\$2,718.84	\$0.00	\$2,718.84	2.1	10,142
Domestic Water Heating Upgrade	0	0.0	67.1	\$729.41	\$11,565.17	\$400.00	\$11,165.17	15.3	7,853
Install High Efficiency Gas Water Heater	0	0.0	65.0	\$706.94	\$11,558.00	\$400.00	\$11,158.00	15.8	7,611
Install Low-Flow Domestic Hot Water Devices	0	0.0	2.1	\$22.47	\$7.17	\$0.00	\$7.17	0.3	242
Food Service Equipment & Refrigeration Measures	5,579	0.5	0.0	\$720.09	\$5,415.90	\$375.00	\$5,040.90	7.0	5,618
Refrigerator/Freezer Case Electrically Commutated Motors	1,879	0.2	0.0	\$239.83	\$909.90	\$0.00	\$909.90	3.8	1,892
Refrigeration Controls	1,107	0.0	0.0	\$141.37	\$1,674.00	\$75.00	\$1,599.00	11.3	1,115
Replace Refrigeration Equipment	2,593	0.3	0.0	\$338.89	\$2,832.00	\$300.00	\$2,532.00	7.5	2,611
Plug Load Equipment Control - Vending Machine	24,963	0.0	0.0	\$3,271.65	\$4,830.00	\$0.00	\$4,830.00	1.5	25,138
Vending Machine Control	24,963	0.0	0.0	\$3,271.65	\$4,830.00	\$0.00	\$4,830.00	1.5	25,138
TOTALS	1,923,523	560.9	1,126.4	\$263,826.49	\$2,988,823.32	\$288,411.08	\$2,700,412.24	10.2	2,068,864

* - 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 the expedited 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 ₂ e Emissions Reduction (lbs)
Lighting Upgrades		1,058,096	268.4	0.0	\$138,266.58	\$1,035,237.91	\$150,000.00	\$885,237.91	6.4	1,065,494
ECM 1	Install LED Fixtures	191,447	32.4	0.0	\$25,269.79	\$272,832.25	\$26,745.00	\$246,087.25	9.7	192,785
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,764	0.5	0.0	\$220.26	\$2,144.00	\$130.00	\$2,014.00	9.1	1,776
ECM 3	Retrofit Fixtures with LED Lamps	829,222	233.2	0.0	\$108,074.09	\$736,922.21	\$123,125.00	\$613,797.21	5.7	835,020
ECM 4	Install LED Exit Signs	35,663	2.3	0.0	\$4,702.44	\$23,339.45	\$0.00	\$23,339.45	5.0	35,912
Lighting Control Measures		226,744	63.5	0.0	\$29,584.44	\$320,526.00	\$38,286.00	\$282,240.00	9.5	228,329
ECM 5	Install Occupancy Sensor Lighting Controls	210,025	59.3	0.0	\$27,387.24	\$291,196.00	\$37,650.00	\$253,546.00	9.3	211,494
ECM 6	Install Daylight Dimming Controls	3,386	0.4	0.0	\$447.89	\$1,464.00	\$636.00	\$828.00	1.8	3,410
ECM 7	Install High/Low Lighting Controls	13,332	3.7	0.0	\$1,749.31	\$27,866.00	\$0.00	\$27,866.00	15.9	13,425
Motor Upgrades		7,456	1.8	0.0	\$951.59	\$20,716.70	\$0.00	\$20,716.70	21.8	7,508
ECM 8	Premium Efficiency Motors	7,456	1.8	0.0	\$951.59	\$20,716.70	\$0.00	\$20,716.70	21.8	7,508
Variable Frequency Drive (VFD) Measures		305,798	78.3	0.0	\$39,977.11	\$228,345.79	\$30,900.00	\$197,445.79	4.9	307,936
ECM 9	Install VFDs on Constant Volume (CV) HVAC	51,570	15.6	0.0	\$6,563.61	\$56,317.90	\$8,400.00	\$47,917.90	7.3	51,931
ECM 10	Install VFDs on Chilled Water Pumps	133,090	41.5	0.0	\$17,754.81	\$93,943.10	\$22,500.00	\$71,443.10	4.0	134,021
ECM 11	Install VFDs on Hot Water Pumps	121,138	21.3	0.0	\$15,658.69	\$78,084.79	\$0.00	\$78,084.79	5.0	121,985
Electric Unitary HVAC Measures		48,897	5.9	0.0	\$6,242.38	\$43,110.24	\$1,748.00	\$41,362.24	6.6	49,239
ECM 12	Install High Efficiency Heat Pumps	48,897	5.9	0.0	\$6,242.38	\$43,110.24	\$1,748.00	\$41,362.24	6.6	49,239
Electric Chiller Replacement		176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
ECM 13	Install High Efficiency Chillers	176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
HVAC System Improvements		9,418	0.0	5.6	\$1,305.68	\$2,718.84	\$0.00	\$2,718.84	2.1	10,142
ECM 14	Implement Demand Control Ventilation	9,418	0.0	5.6	\$1,305.68	\$2,718.84	\$0.00	\$2,718.84	2.1	10,142
Domestic Water Heating Upgrade		0	0.0	67.1	\$729.41	\$11,565.17	\$400.00	\$11,165.17	15.3	7,853
ECM 15	Install High Efficiency Gas Water Heater	0	0.0	65.0	\$706.94	\$11,558.00	\$400.00	\$11,158.00	15.8	7,611
ECM 16	Install Low-Flow Domestic Hot Water Devices	0	0.0	2.1	\$22.47	\$7.17	\$0.00	\$7.17	0.3	242
Food Service Equipment & Refrigeration Measures		5,579	0.5	0.0	\$720.09	\$5,415.90	\$375.00	\$5,040.90	7.0	5,618
ECM 17	Refrigerator/Freezer Case Electrically Commutated Motors	1,879	0.2	0.0	\$239.83	\$909.90	\$0.00	\$909.90	3.8	1,892
ECM 18	Refrigeration Controls	1,107	0.0	0.0	\$141.37	\$1,674.00	\$75.00	\$1,599.00	11.3	1,115
ECM 19	Replace Refrigeration Equipment	2,593	0.3	0.0	\$338.89	\$2,832.00	\$300.00	\$2,532.00	7.5	2,611
Plug Load Equipment Control - Vending Machine		24,963	0.0	0.0	\$3,271.65	\$4,830.00	\$0.00	\$4,830.00	1.5	25,138
ECM 20	Vending Machine Control	24,963	0.0	0.0	\$3,271.65	\$4,830.00	\$0.00	\$4,830.00	1.5	25,138
TOTALS		1,863,474	536.7	72.7	\$244,394.27	\$1,944,656.95	\$252,989.00	\$1,691,667.95	6.9	1,885,015

* - 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).

Administration Building




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			18,612	4.8	0.0	\$2,605.40	\$25,105.57	\$3,070.00	\$22,035.57	8.5	18,742
ECM 1	Install LED Fixtures	Yes	5,261	0.8	0.0	\$736.49	\$13,432.22	\$910.00	\$12,522.22	17.0	5,298
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	16	0.0	0.0	\$2.29	\$196.00	\$10.00	\$186.00	81.1	16
ECM 3	Retrofit Fixtures with LED Lamps	Yes	12,599	3.8	0.0	\$1,763.61	\$10,724.47	\$2,150.00	\$8,574.46	4.9	12,687
ECM 4	Install LED Exit Signs	Yes	736	0.1	0.0	\$103.01	\$752.89	\$0.00	\$752.89	7.3	741
Lighting Control Measures			3,441	1.0	0.0	\$481.61	\$6,712.00	\$880.00	\$5,832.00	12.1	3,465
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	3,441	1.0	0.0	\$481.61	\$6,712.00	\$880.00	\$5,832.00	12.1	3,465
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	\$225.63	\$230.00	\$0.00	\$230.00	1.0	1,623
ECM 6	Vending Machine Control	Yes	1,612	0.0	0.0	\$225.63	\$230.00	\$0.00	\$230.00	1.0	1,623
TOTALS			23,665	5.8	0.0	\$3,312.64	\$32,047.57	\$3,950.00	\$28,097.57	8.5	23,830

* - 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.

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Administration Building - Benchmarking





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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score¹

Administration Building
Primary Property Type: Office
Gross Floor Area (ft²): 7,900
Built: 1980
For Year Ending: April 30, 2017
Date Generated: April 04, 2018

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

Property & Contact Information

Property Address Administration Building 1980 Township Drive Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
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Property ID: 6275368

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel	National Median Comparison
70 kBtu/ft ²	Electric - Grid (kBtu) 553,234 (100%)	National Median Site EUI (kBtu/ft ²) 58
		National Median Source EUI (kBtu/ft ²) 182.3
		% Diff from National Median Source EUI 21%
Source EUI		Annual Emissions
219.9 kBtu/ft ²		Greenhouse Gas Emissions (Metric Tons CO ₂ e/year) 61


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)

Asher Holmes Elementary




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			87,938	26.4	0.0	\$11,491.64	\$155,441.21	\$14,940.00	\$140,501.21	12.2	88,553
ECM 1	Install LED Fixtures	Yes	23,393	5.3	0.0	\$3,057.02	\$66,594.77	\$4,700.00	\$61,894.77	20.2	23,557
ECM 2	Retrofit Fixtures with LED Lamps	Yes	63,396	21.0	0.0	\$8,284.55	\$86,802.89	\$10,240.00	\$76,562.89	9.2	63,839
ECM 3	Install LED Exit Signs	Yes	1,148	0.1	0.0	\$150.08	\$2,043.55	\$0.00	\$2,043.55	13.6	1,156
Lighting Control Measures			17,435	5.8	0.0	\$2,278.41	\$28,856.00	\$2,780.00	\$26,076.00	11.4	17,557
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	15,910	5.3	0.0	\$2,079.06	\$24,304.00	\$2,740.00	\$21,564.00	10.4	16,021
ECM 5	Install High/Low Lighting Controls	Yes	1,526	0.5	0.0	\$199.35	\$4,320.00	\$0.00	\$4,320.00	21.7	1,536
HVAC System Improvements			709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
ECM 6	Implement Demand Control Ventilation	Yes	709	0.0	5.6	\$153.77	\$1,359.42	\$0.00	\$1,359.42	8.8	1,372
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 7	Vending Machine Control	Yes	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
TOTALS			108,036	32.3	5.6	\$14,179.22	\$186,116.63	\$17,720.00	\$168,396.63	11.9	109,450

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Asher Holmes Elementary - Benchmarking



ENERGY STAR® Statement of Energy Performance	
 LEARN MORE AT energy.gov	Asher Holmes Elementary School 45 ENERGY STAR® Score ¹
Primary Property Type: K-12 School Gross Floor Area (ft²): 70,825 Built: 1974 For Year Ending: March 31, 2017 Date Generated: April 04, 2018	
<small>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.</small>	
Property & Contact Information	
Property Address Asher Holmes Elementary School 48 Menzel Lane Morganville, New Jersey 07751	Property Owner Marlboro Township Board of Education 1080 Township Drive Marlboro, NJ 07746 (732) 972-2000
Primary Contact Cindy Barr-Rague 1080 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org	
Property ID: 6275413	
Energy Consumption and Energy Use Intensity (EUI)	
Site EUI 70.2 kBtu/ft²	Annual Energy by Fuel Electric - Grid (kBtu) 1,448,065 (29%) Natural Gas (kBtu) 3,523,304 (71%)
Source EUI 116.5 kBtu/ft²	National Median Comparison National Median Site EUI (kBtu/ft²) 67.5 National Median Source EUI (kBtu/ft²) 112 % Diff from National Median Source EUI 4% Annual Emissions Greenhouse Gas Emissions (Metric Tons CO2e/year) 348
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	
_____ () - _____	
<div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto;"></div> Professional Engineer Stamp (if applicable)	

David C. Abbott Early Learning Center




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			71,779	20.6	0.0	\$9,799.24	\$70,000.86	\$11,510.00	\$58,490.86	6.0	72,281
ECM 1	Install LED Fixtures	Yes	6,990	0.9	0.0	\$954.34	\$7,581.33	\$1,400.00	\$6,181.33	6.5	7,039
ECM 2	Retrofit Fixtures with LED Lamps	Yes	64,788	19.7	0.0	\$8,844.90	\$62,419.54	\$10,110.00	\$52,309.54	5.9	65,241
Lighting Control Measures			14,851	4.6	0.0	\$2,027.51	\$12,824.00	\$3,430.00	\$9,394.00	4.6	14,955
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	14,851	4.6	0.0	\$2,027.51	\$12,824.00	\$3,430.00	\$9,394.00	4.6	14,955
Motor Upgrades			2,884	0.7	0.0	\$393.73	\$9,710.95	\$0.00	\$9,710.95	24.7	2,904
ECM 4	Premium Efficiency Motors	Yes	2,884	0.7	0.0	\$393.73	\$9,710.95	\$0.00	\$9,710.95	24.7	2,904
Variable Frequency Drive (VFD) Measures			67,169	11.1	0.0	\$9,169.95	\$39,868.25	\$5,400.00	\$34,468.25	3.8	67,639
ECM 5	Install VFDs on Constant Volume (CV) HVAC	Yes	15,615	5.0	0.0	\$2,131.78	\$20,647.95	\$3,000.00	\$17,647.95	8.3	15,724
ECM 6	Install VFDs on Chilled Water Pumps	Yes	42,597	4.8	0.0	\$5,815.29	\$12,668.60	\$2,400.00	\$10,268.60	1.8	42,894
ECM 7	Install VFDs on Hot Water Pumps	Yes	8,958	1.3	0.0	\$1,222.89	\$6,551.70	\$0.00	\$6,551.70	5.4	9,020
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	\$266.81	\$460.00	\$0.00	\$460.00	1.7	1,968
ECM 8	Vending Machine Control	Yes	1,954	0.0	0.0	\$266.81	\$460.00	\$0.00	\$460.00	1.7	1,968
TOTALS			158,638	37.1	0.0	\$21,657.24	\$132,864.06	\$20,340.00	\$112,524.06	5.2	159,747

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

David C. Abbott ELC - Benchmarking





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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score¹

David C. Abbott Early Learning Center
Primary Property Type: K-12 School
Gross Floor Area (ft²): 39,538
Built: 2002
For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information

Property Address David C. Abbott Early Learning Center 171 Tennent Road Morganville, New Jersey 07751	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
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Property ID: 6275899

Energy Consumption and Energy Use Intensity (EUI)

Site EUI 89.4 kBtu/ft²	Annual Energy by Fuel <table><tr><td>Electric - Grid (kBtu)</td><td>1,612,102 (46%)</td></tr><tr><td>Natural Gas (kBtu)</td><td>1,924,297 (54%)</td></tr></table>	Electric - Grid (kBtu)	1,612,102 (46%)	Natural Gas (kBtu)	1,924,297 (54%)	National Median Comparison <table><tr><td>National Median Site EUI (kBtu/ft²)</td><td>62.1</td></tr><tr><td>National Median Source EUI (kBtu/ft²)</td><td>124.4</td></tr><tr><td>% Diff from National Median Source EUI</td><td>44%</td></tr></table>	National Median Site EUI (kBtu/ft²)	62.1	National Median Source EUI (kBtu/ft²)	124.4	% Diff from National Median Source EUI	44%
Electric - Grid (kBtu)	1,612,102 (46%)											
Natural Gas (kBtu)	1,924,297 (54%)											
National Median Site EUI (kBtu/ft²)	62.1											
National Median Source EUI (kBtu/ft²)	124.4											
% Diff from National Median Source EUI	44%											
Source EUI 179.1 kBtu/ft²	Annual Emissions <table><tr><td>Greenhouse Gas Emissions (Metric Tons CO2e/year)</td><td>281</td></tr></table>		Greenhouse Gas Emissions (Metric Tons CO2e/year)	281								
Greenhouse Gas Emissions (Metric Tons CO2e/year)	281											


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)

Frank Defino Central Elementary



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			83,662	23.9	0.0	\$10,932.89	\$93,852.90	\$14,350.00	\$79,502.90	7.3	84,247
ECM 1	Install LED Fixtures	Yes	12,126	1.7	0.0	\$1,584.65	\$21,366.16	\$2,460.00	\$18,906.16	11.9	12,211
ECM 2	Retrofit Fixtures with LED Lamps	Yes	61,707	21.5	0.0	\$8,063.83	\$68,937.43	\$11,890.00	\$57,047.43	7.1	62,139
ECM 3	Install LED Exit Signs	Yes	9,829	0.6	0.0	\$1,284.41	\$3,549.32	\$0.00	\$3,549.32	2.8	9,897
Lighting Control Measures			16,098	5.7	0.0	\$2,103.68	\$32,132.00	\$3,655.00	\$28,477.00	13.5	16,211
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	16,098	5.7	0.0	\$2,103.68	\$32,132.00	\$3,655.00	\$28,477.00	13.5	16,211
Gas Heating (HVAC/Process) Replacement			0	0.0	197.2	\$2,170.79	\$118,266.10	\$3,480.88	\$114,785.22	52.9	23,087
	Install High Efficiency Hot Water Boilers	No	0	0.0	197.2	\$2,170.79	\$118,266.10	\$3,480.88	\$114,785.22	52.9	23,087
Food Service Equipment & Refrigeration Measures			2,593	0.3	0.0	\$338.89	\$2,832.00	\$300.00	\$2,532.00	7.5	2,611
ECM 5	Replace Refrigeration Equipment	Yes	2,593	0.3	0.0	\$338.89	\$2,832.00	\$300.00	\$2,532.00	7.5	2,611
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 6	Vending Machine Control	Yes	1,954	0.0	0.0	\$255.39	\$460.00	\$0.00	\$460.00	1.8	1,968
RECOMMENDED MEASURE TOTALS			104,308	29.9	0.0	\$13,630.86	\$129,276.90	\$18,305.00	\$110,971.90	8.1	105,037
TOTALS			104,308	29.9	197.2	\$15,801.65	\$247,543.00	\$21,785.88	\$225,757.12	14.3	128,125

* - 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).

Frank Defino Central Elementary - Benchmarking



ENERGY STAR® Statement of Energy Performance

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ENERGY STAR®
Score¹

Frank Defino Central Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 70,047
Built: 1956

For Year Ending: April 30, 2017
Date Generated: April 04, 2018

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

Property & Contact Information			
Property Address Frank Defino Central Elementary School 175 State Highway 79 Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1850 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1850 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org	
Property ID: 6277916			

Energy Consumption and Energy Use Intensity (EUI)			
Site EUI	Annual Energy by Fuel	National Median Comparison	
95.8 kBtu/ft²	Natural Gas (kBtu)	National Median Site EUI (kBtu/ft²)	69.6
	Electric - Grid (kBtu)	National Median Source EUI (kBtu/ft²)	117.7
		% Diff from National Median Source EUI	38%
Source EUI		Annual Emissions	
161.9 kBtu/ft²		Greenhouse Gas Emissions (Metric Tons CO2e/year)	475

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)

Frank J. Dugan Elementary




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			117,402	25.3	0.0	\$14,196.17	\$66,804.98	\$10,960.00	\$55,844.98	3.9	118,223
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	490	0.1	0.0	\$59.29	\$509.00	\$30.00	\$479.00	8.1	494
ECM 2	Retrofit Fixtures with LED Lamps	Yes	116,912	25.2	0.0	\$14,136.88	\$66,295.98	\$10,930.00	\$55,365.98	3.9	117,729
Lighting Control Measures			27,141	5.8	0.0	\$3,281.85	\$22,150.00	\$2,315.00	\$19,835.00	6.0	27,331
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	27,141	5.8	0.0	\$3,281.85	\$22,150.00	\$2,315.00	\$19,835.00	6.0	27,331
Motor Upgrades			4,133	0.9	0.0	\$499.71	\$9,163.63	\$0.00	\$9,163.63	18.3	4,161
ECM 4	Premium Efficiency Motors	Yes	4,133	0.9	0.0	\$499.71	\$9,163.63	\$0.00	\$9,163.63	18.3	4,161
Variable Frequency Drive (VFD) Measures			50,147	9.4	0.0	\$6,063.78	\$49,931.69	\$4,200.00	\$45,731.69	7.5	50,498
ECM 5	Install VFDs on Constant Volume (CV) HVAC	Yes	28,525	7.1	0.0	\$3,449.21	\$30,475.50	\$4,200.00	\$26,275.50	7.6	28,724
ECM 6	Install VFDs on Hot Water Pumps	Yes	21,622	2.3	0.0	\$2,614.57	\$19,456.19	\$0.00	\$19,456.19	7.4	21,774
Electric Unitary HVAC Measures			5,001	2.4	0.0	\$604.78	\$50,593.70	\$2,116.00	\$48,477.70	80.2	5,036
	Install High Efficiency Electric AC	No	5,001	2.4	0.0	\$604.78	\$50,593.70	\$2,116.00	\$48,477.70	80.2	5,036
Gas Heating (HVAC/Process) Replacement			0	0.0	11.8	\$134.66	\$2,265.73	\$400.00	\$1,865.73	13.9	1,387
	Install High Efficiency Furnaces	No	0	0.0	11.8	\$134.66	\$2,265.73	\$400.00	\$1,865.73	13.9	1,387
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	\$236.32	\$460.00	\$0.00	\$460.00	1.9	1,968
ECM 7	Vending Machine Control	Yes	1,954	0.0	0.0	\$236.32	\$460.00	\$0.00	\$460.00	1.9	1,968
TOTAL FOR RECOMMENDED MEASURES			200,777	41.4	0.0	\$24,277.83	\$148,510.30	\$17,475.00	\$131,035.30	5.4	202,181
TOTAL FOR ALL MEASURES			205,779	43.8	11.8	\$25,017.26	\$201,369.73	\$19,991.00	\$181,378.73	7.3	208,604

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

Frank J. Dugan Elementary - Benchmarking





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ENERGY STAR® Statement of Energy Performance

10

ENERGY STAR® Score¹

Frank J. Dugan Elementary School
Primary Property Type: K-12 School
Gross Floor Area (ft²): 83,000
Built: 1988
For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information		
Property Address Frank J. Dugan Elementary School 48 Topanemus Road Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
Property ID: 6277932		

Energy Consumption and Energy Use Intensity (EUI)			
Site EUI 99.9 kBtu/ft²	Annual Energy by Fuel		National Median Comparison
	Natural Gas (kBtu)	5,508,456 (66%)	National Median Site EUI (kBtu/ft²) 66
	Electric - Grid (kBtu)	2,781,462 (34%)	National Median Source EUI (kBtu/ft²) 115.6
Source EUI 174.9 kBtu/ft²			% Diff from National Median Source EUI 51%
			Annual Emissions
			Greenhouse Gas Emissions (Metric Tons CO2e/year) 601


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)

Marlboro Elementary School




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			64,372	18.8	0.0	\$8,217.89	\$67,994.85	\$12,525.00	\$55,469.85	6.7	64,822
ECM 1	Install LED Fixtures	Yes	1,658	0.2	0.0	\$211.69	\$3,905.99	\$200.00	\$3,705.99	17.5	1,670
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	250	0.1	0.0	\$31.88	\$327.50	\$25.00	\$302.50	9.5	251
ECM 3	Retrofit Fixtures with LED Lamps	Yes	62,464	18.5	0.0	\$7,974.33	\$63,761.37	\$12,300.00	\$51,461.37	6.5	62,901
Lighting Control Measures			20,058	6.2	0.0	\$2,560.69	\$26,090.00	\$2,820.00	\$23,270.00	9.1	20,198
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	18,079	5.6	0.0	\$2,308.05	\$22,490.00	\$2,820.00	\$19,670.00	8.5	18,206
ECM 5	Install High/Low Lighting Controls	Yes	1,979	0.6	0.0	\$252.64	\$3,600.00	\$0.00	\$3,600.00	14.2	1,993
Motor Upgrades			4,116	1.2	0.0	\$525.45	\$7,145.24	\$0.00	\$7,145.24	13.6	4,145
	Premium Efficiency Motors	No	4,116	1.2	0.0	\$525.45	\$7,145.24	\$0.00	\$7,145.24	13.6	4,145
Electric Unitary HVAC Measures			48,897	5.9	0.0	\$6,242.38	\$43,110.24	\$1,748.00	\$41,362.24	6.6	49,239
ECM 7	Install High Efficiency Heat Pumps	Yes	48,897	5.9	0.0	\$6,242.38	\$43,110.24	\$1,748.00	\$41,362.24	6.6	49,239
Gas Heating (HVAC/Process) Replacement			0	0.0	400.8	\$4,358.98	\$187,730.50	\$0.00	\$187,730.50	43.1	46,928
	Install High Efficiency Hot Water Boilers	No	0	0.0	400.8	\$4,358.98	\$187,730.50	\$0.00	\$187,730.50	43.1	46,928
Domestic Water Heating Upgrade			0	0.0	67.1	\$729.41	\$11,565.17	\$400.00	\$11,165.17	15.3	7,853
ECM 8	Install High Efficiency Gas Water Heater	Yes	0	0.0	65.0	\$706.94	\$11,558.00	\$400.00	\$11,158.00	15.8	7,611
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	2.1	\$22.47	\$7.17	\$0.00	\$7.17	0.3	242
Food Service Equipment & Refrigeration Measures			2,986	0.2	0.0	\$381.20	\$2,583.90	\$75.00	\$2,508.90	6.6	3,007
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,879	0.2	0.0	\$239.83	\$909.90	\$0.00	\$909.90	3.8	1,892
ECM 11	Refrigeration Controls	Yes	1,107	0.0	0.0	\$141.37	\$1,674.00	\$75.00	\$1,599.00	11.3	1,115
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	\$249.50	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM 12	Vending Machine Control	Yes	1,954	0.0	0.0	\$249.50	\$460.00	\$0.00	\$460.00	1.8	1,968
TOTAL FOR RECOMMENDED MEASURES			170,301	35.5	67.1	\$22,470.50	\$168,208.36	\$17,568.00	\$150,640.36	6.7	179,344
TOTAL FOR ALL MEASURES			174,417	36.7	467.9	\$27,354.93	\$363,084.11	\$17,568.00	\$345,516.11	12.6	230,417

* - 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).

Marlboro Elementary School - Benchmarking



**ENERGY STAR® Statement of Energy Performance**

34
ENERGY STAR®
Score¹

Marlboro Elementary School
Primary Property Type: K-12 School
Gross Floor Area (ft²): 74,129
Built: 1970
For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information		
Property Address Marlboro Elementary School 100 School Road West Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
Property ID: 6277898		

Energy Consumption and Energy Use Intensity (EUI)				
Site EUI 78.4 kBtu/ft²	Annual Energy by Fuel		National Median Comparison	
	Natural Gas (kBtu)	3,934,408 (68%)	National Median Site EUI (kBtu/ft²)	68.4
	Electric - Grid (kBtu)	1,874,116 (32%)	National Median Source EUI (kBtu/ft²)	117.9
Source EUI 135.1 kBtu/ft²			% Diff from National Median Source EUI	15%
			Annual Emissions	
			Greenhouse Gas Emissions (Metric Tons CO₂e/year)	417


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)

Marlboro Memorial Middle School




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			279,438	56.7	0.0	\$36,843.16	\$212,826.89	\$36,640.00	\$176,186.89	4.8	281,392
ECM 1	Install LED Fixtures	Yes	61,091	8.2	0.0	\$8,054.68	\$48,930.03	\$9,540.00	\$39,390.03	4.9	61,518
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	35	0.1	0.0	\$4.67	\$234.00	\$20.00	\$214.00	45.9	36
ECM 3	Retrofit Fixtures with LED Lamps	Yes	212,005	48.0	0.0	\$27,952.23	\$155,918.90	\$27,080.00	\$128,838.90	4.6	213,487
ECM 4	Install LED Exit Signs	Yes	6,307	0.4	0.0	\$831.59	\$7,743.96	\$0.00	\$7,743.96	9.3	6,351
Lighting Control Measures			59,729	13.2	0.0	\$7,875.07	\$82,350.00	\$9,345.00	\$73,005.00	9.3	60,146
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	53,848	11.9	0.0	\$7,099.70	\$72,090.00	\$9,345.00	\$62,745.00	8.8	54,224
ECM 6	Install High/Low Lighting Controls	Yes	5,881	1.3	0.0	\$775.37	\$10,260.00	\$0.00	\$10,260.00	13.2	5,922
Variable Frequency Drive (VFD) Measures			90,811	39.3	0.0	\$11,973.22	\$83,062.50	\$16,500.00	\$66,562.50	5.6	91,446
ECM 7	Install VFDs on Chilled Water Pumps	Yes	70,212	30.4	0.0	\$9,257.24	\$64,330.40	\$16,500.00	\$47,830.40	5.2	70,703
ECM 8	Install VFDs on Hot Water Pumps	Yes	20,599	8.9	0.0	\$2,715.98	\$18,732.10	\$0.00	\$18,732.10	6.9	20,743
Plug Load Equipment Control - Vending Machine			5,178	0.0	0.0	\$682.71	\$920.00	\$0.00	\$920.00	1.3	5,214
ECM 9	Vending Machine Control	Yes	5,178	0.0	0.0	\$682.71	\$920.00	\$0.00	\$920.00	1.3	5,214
TOTALS			435,157	109.3	0.0	\$57,374.16	\$379,159.39	\$62,485.00	\$316,674.39	5.5	438,199

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

Marlboro Memorial Middle School - Benchmarking





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ENERGY STAR® Statement of Energy Performance

21

ENERGY STAR® Score¹

Marlboro Memorial Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 154,373
Built: 2003

For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information		
Property Address Marlboro Memorial Middle School 71 Nolan Road Morganville, New Jersey 07751	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
Property ID: 6277890		

Energy Consumption and Energy Use Intensity (EUI)												
Site EUI 81.5 kBtu/ft²	Annual Energy by Fuel <table><tr><td>Natural Gas (kBtu)</td><td>6,466,704 (51%)</td></tr><tr><td>Electric - Grid (kBtu)</td><td>6,115,669 (49%)</td></tr></table>	Natural Gas (kBtu)	6,466,704 (51%)	Electric - Grid (kBtu)	6,115,669 (49%)	National Median Comparison <table><tr><td>National Median Site EUI (kBtu/ft²)</td><td>63</td></tr><tr><td>National Median Source EUI (kBtu/ft²)</td><td>130.1</td></tr><tr><td>% Diff from National Median Source EUI</td><td>29%</td></tr></table>	National Median Site EUI (kBtu/ft²)	63	National Median Source EUI (kBtu/ft²)	130.1	% Diff from National Median Source EUI	29%
Natural Gas (kBtu)	6,466,704 (51%)											
Electric - Grid (kBtu)	6,115,669 (49%)											
National Median Site EUI (kBtu/ft²)	63											
National Median Source EUI (kBtu/ft²)	130.1											
% Diff from National Median Source EUI	29%											
Source EUI 168.4 kBtu/ft²	Annual Emissions Greenhouse Gas Emissions (Metric Tons CO2e/year) 1,022											

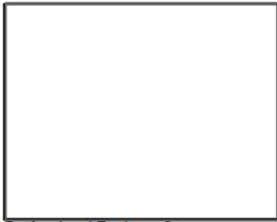
Signature & Stamp of Verifying Professional

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)

Marlboro Middle School




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			244,917	62.9	0.0	\$32,390.55	\$253,216.34	\$29,870.00	\$223,346.34	6.9	246,629
ECM 1	Install LED Fixtures	Yes	61,352	10.9	0.0	\$8,113.91	\$95,044.80	\$3,810.00	\$91,234.80	11.2	61,781
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	56	0.0	0.0	\$7.36	\$289.50	\$15.00	\$274.50	37.3	56
ECM 3	Retrofit Fixtures with LED Lamps	Yes	170,632	51.1	0.0	\$22,566.25	\$150,353.19	\$26,045.00	\$124,308.19	5.5	171,825
ECM 4	Install LED Exit Signs	Yes	12,877	0.8	0.0	\$1,703.03	\$7,528.85	\$0.00	\$7,528.85	4.4	12,967
Lighting Control Measures			48,620	14.4	0.0	\$6,430.02	\$83,934.00	\$9,925.00	\$74,009.00	11.5	48,960
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	45,648	13.6	0.0	\$6,036.95	\$76,104.00	\$9,925.00	\$66,179.00	11.0	45,967
ECM 6	Install High/Low Lighting Controls	Yes	2,972	0.9	0.0	\$393.07	\$7,830.00	\$0.00	\$7,830.00	19.9	2,993
Motor Upgrades			2,448	1.3	0.0	\$323.77	\$11,836.46	\$0.00	\$11,836.46	36.6	2,465
	Premium Efficiency Motors	No	2,448	1.3	0.0	\$323.77	\$11,836.46	\$0.00	\$11,836.46	36.6	2,465
Variable Frequency Drive (VFD) Measures			58,676	12.9	0.0	\$7,759.93	\$32,527.45	\$4,800.00	\$27,727.45	3.6	59,086
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	7,430	3.5	0.0	\$982.62	\$5,194.45	\$1,200.00	\$3,994.45	4.1	7,482
ECM 8	Install VFDs on Chilled Water Pumps	Yes	20,282	6.2	0.0	\$2,682.28	\$16,944.10	\$3,600.00	\$13,344.10	5.0	20,424
ECM 9	Install VFDs on Hot Water Pumps	Yes	30,964	3.2	0.0	\$4,095.03	\$10,388.90	\$0.00	\$10,388.90	2.5	31,181
Electric Unitary HVAC Measures			48,483	19.4	0.0	\$6,411.99	\$368,955.58	\$21,798.00	\$347,157.58	54.1	48,822
	Install High Efficiency Electric AC	No	48,483	19.4	0.0	\$6,411.99	\$368,955.58	\$21,798.00	\$347,157.58	54.1	48,822
Electric Chiller Replacement			176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
ECM 10	Install High Efficiency Chillers	Yes	176,523	118.3	0.0	\$23,345.34	\$272,190.40	\$31,280.00	\$240,910.40	10.3	177,757
Gas Heating (HVAC/Process) Replacement			0	0.0	311.9	\$3,421.51	\$220,882.84	\$1,200.00	\$219,682.84	64.2	36,519
	Install High Efficiency Hot Water Boilers	No	0	0.0	278.4	\$3,053.63	\$215,082.56	\$0.00	\$215,082.56	70.4	32,592
	Install High Efficiency Furnaces	No	0	0.0	33.5	\$367.88	\$5,800.28	\$1,200.00	\$4,600.28	12.5	3,926
Plug Load Equipment Control - Vending Machine			4,836	0.0	0.0	\$639.50	\$690.00	\$0.00	\$690.00	1.1	4,869
ECM 11	Vending Machine Control	Yes	4,836	0.0	0.0	\$639.50	\$690.00	\$0.00	\$690.00	1.1	4,869
Recommended Measures TOTALS			533,570	208.5	0.0	\$70,565.35	\$642,558.19	\$75,875.00	\$566,683.19	8.0	537,301
Evaluated Measures TOTALS			584,501	229.1	311.9	\$80,722.62	\$1,244,233.07	\$98,873.00	\$1,145,360.07	14.2	625,107

* - 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).

Marlboro Middle School - Benchmarking



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

56

ENERGY STAR® Score¹

Marlboro Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 198,820
Built: 1976

For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information		
Property Address Marlboro Middle School 355 County Road 520 Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-ague@mtps.org
Property ID: 6277832		

Energy Consumption and Energy Use Intensity (EUI)			
Site EUI 58.4 kBtu/ft²	Annual Energy by Fuel		National Median Comparison
	Electric - Grid (kBtu)	5,377,312 (46%)	National Median Site EUI (kBtu/ft²) 61.7
	Natural Gas (kBtu)	6,224,931 (54%)	National Median Source EUI (kBtu/ft²) 124.6
			% Diff from National Median Source EUI -6%
Source EUI 117.8 kBtu/ft²			Annual Emissions
			Greenhouse Gas Emissions (Metric Tons CO2e/year) 927


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)

Robertsville Elementary School




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			74,090	26.5	0.0	0.0	\$9,799.80	\$82,876.87	\$15,090.00	\$67,786.87	6.9	74,608
ECM1	Install LED Fixtures	Yes	15,006	3.6	0.0	0.0	\$1,984.82	\$13,393.72	\$3,400.00	\$9,993.72	5.0	15,111
ECM2	Retrofit Fixtures with LED Lamps	Yes	54,318	22.6	0.0	0.0	\$7,184.66	\$67,762.27	\$11,690.00	\$56,072.27	7.8	54,698
ECM3	Install LED Exit Signs	Yes	4,765	0.3	0.0	0.0	\$630.32	\$1,720.88	\$0.00	\$1,720.88	2.7	4,799
Lighting Control Measures			17,009	6.2	0.0	0.0	\$2,249.76	\$23,818.00	\$2,931.00	\$20,887.00	9.3	17,128
ECM4	Install Occupancy Sensor Lighting Controls	Yes	12,648	5.4	0.0	0.0	\$1,672.99	\$20,498.00	\$2,295.00	\$18,203.00	10.9	12,737
ECM5	Install Daylight Dimming Controls	Yes	3,386	0.4	0.0	0.0	\$447.89	\$1,464.00	\$636.00	\$828.00	1.8	3,410
ECM6	Install High/Low Lighting Controls	Yes	974	0.4	0.0	0.0	\$128.88	\$1,856.00	\$0.00	\$1,856.00	14.4	981
Motor Upgrades			440	0.2	0.0	0.0	\$58.15	\$1,842.12	\$0.00	\$1,842.12	31.7	443
ECM7	Premium Efficiency Motors	Yes	440	0.2	0.0	0.0	\$58.15	\$1,842.12	\$0.00	\$1,842.12	31.7	443
Variable Frequency Drive (VFD) Measures			6,962	1.3	0.0	0.0	\$920.80	\$6,551.70	\$0.00	\$6,551.70	7.1	7,010
ECM8	Install VFDs on Hot Water Pumps	Yes	6,962	1.3	0.0	0.0	\$920.80	\$6,551.70	\$0.00	\$6,551.70	7.1	7,010
Gas Heating (HVAC/Process) Replacement			0	0.0	132.0	132.0	\$1,480.29	\$76,490.22	\$6,427.20	\$70,063.02	47.3	15,460
	Install High Efficiency Hot Water Boilers	No	0	0.0	132.0	132.0	\$1,480.29	\$76,490.22	\$6,427.20	\$70,063.02	47.3	15,460
HVAC System Improvements			8,709	0.0	0.0	0.0	\$1,151.91	\$1,359.42	\$0.00	\$1,359.42	1.2	8,770
ECM9	Implement Demand Control Ventilation	Yes	8,709	0.0	0.0	0.0	\$1,151.91	\$1,359.42	\$0.00	\$1,359.42	1.2	8,770
Plug Load Equipment Control - Vending Machine			1,954	0.0	0.0	0.0	\$258.50	\$460.00	\$0.00	\$460.00	1.8	1,968
ECM10	Vending Machine Control	Yes	1,954	0.0	0.0	0.0	\$258.50	\$460.00	\$0.00	\$460.00	1.8	1,968
Recommended Measures TOTALS			109,163	34	0	0	\$14,438.92	\$116,908.11	\$18,021.00	\$98,887.11	6.8	109,926
TOTALS			109,163	34.1	132.0	132.0	\$15,919.22	\$193,398.32	\$24,448.20	\$168,950.12	10.6	125,386

* - 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).

Robertsville Elementary School - Benchmarking





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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR®
Score¹

Robertsville Elementary School
Primary Property Type: K-12 School
Gross Floor Area (ft²): 70,880
Built: 1968
For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information

Property Address Robertsville Elementary School 36 Menel Lane Morganville, New Jersey 07751	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
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Property ID: 6277822

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel	National Median Comparison	
60.9 kBtu/ft²	Electric - Grid (kBtu) 1,322,218 (31%) Natural Gas (kBtu) 2,991,151 (69%)	National Median Site EUI (kBtu/ft²) 69 National Median Source EUI (kBtu/ft²) 116.7 % Diff from National Median Source EUI -12%	
Source EUI 102.9 kBtu/ft²		Annual Emissions Greenhouse Gas Emissions (Metric Tons CO2e/year) 306	


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)

Transportation Building




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			15,885	2.5	0.0	\$1,989.81	\$7,117.40	\$1,045.00	\$6,072.40	3.1	15,997
ECM 1	Install LED Fixtures	Yes	4,568	0.6	0.0	\$572.19	\$2,583.23	\$325.00	\$2,258.23	3.9	4,600
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	916	0.2	0.0	\$114.77	\$588.00	\$30.00	\$558.00	4.9	923
ECM 3	Retrofit Fixtures with LED Lamps	Yes	10,401	1.7	0.0	\$1,302.85	\$3,946.17	\$690.00	\$3,256.17	2.5	10,474
Lighting Control Measures			2,362	0.4	0.0	\$295.84	\$1,892.00	\$245.00	\$1,647.00	5.6	2,378
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	2,362	0.4	0.0	\$295.84	\$1,892.00	\$245.00	\$1,647.00	5.6	2,378
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	\$201.90	\$230.00	\$0.00	\$230.00	1.1	1,623
ECM 5	Vending Machine Control	Yes	1,612	0.0	0.0	\$201.90	\$230.00	\$0.00	\$230.00	1.1	1,623
TOTALS			19,859	2.9	0.0	\$2,487.55	\$9,239.40	\$1,290.00	\$7,949.40	3.2	19,998

* - 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).

Transportation Building - Benchmarking



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N/A

Transportation Building

Primary Property Type: Repair Services (Vehicle, Shoe, Locksmith, etc.)
Gross Floor Area (ft²): 9,060
Built: 1980

For Year Ending: April 30, 2017
Date Generated: April 04, 2018

ENERGY STAR®
Score¹

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

Property & Contact Information

Property Address Transportation Building 1 Lotta Burke Way Marlboro, New Jersey 07746	Property Owner Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Primary Contact Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org
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Property ID: 6275470

Energy Consumption and Energy Use Intensity (EUI)

Site EUI 103 kBtu/ft ²	Annual Energy by Fuel Electric - Grid (kBtu) 402,498 (43%) Fuel Oil (No. 2) (kBtu) 530,831 (57%)	National Median Comparison National Median Site EUI (kBtu/ft ²) 52.1 National Median Source EUI (kBtu/ft ²) 100.4 % Diff from National Median Source EUI 98%	
Source EUI 198.7 kBtu/ft ²		Annual Emissions Greenhouse Gas Emissions (Metric Tons CO ₂ /year) 84	


Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

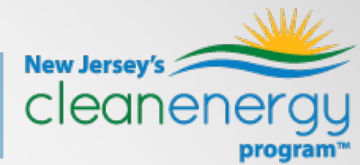
Licensed Professional

() _____



Professional Engineer Stamp
(if applicable)

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 Retrofit
- SmartStart New Construction
- Direct Install
- Large Energy Users

Whole Buildings:

- Pay for Performance Existing Buildings
- Pay for Performance New Construction

Energy Generation:

- Combined Heat and Power (CHP)

OTHER PROGRAMS

Solar Energy Generation:

- SREC Registration Program (SRP)

* eligible programs are highlighted in yellow

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 certain equipment
- 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!

SmartStart: Financing Option



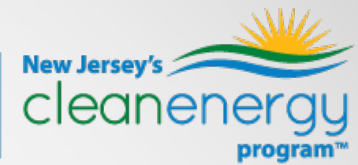
- NJNG provides 0% financing options for SmartStart that will cover up to \$130,000 per year.
- 10 year term-repayments made on regular monthly gas bill
- Need to review project with NJNG to confirm project qualifies.
- The SAVEGREEN program can help with a consultation to discuss your Commercial Energy Efficiency Project.



Direct Install: Overview

- 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 ≤ 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:



Participating Contractor

Hutchinson Mechanical Services

Ed Hutchinson

856-429-5828 x215

edhutchinson@hutchbiz.com

Direct Install: Financing Option



- Eligible NJNG customers can finance the remaining 30 percent balance at 0% APR through the “SAVEGREEN Project® On-Bill Repayment Program” (OBRP) for 36 months.
- For measures that may not qualify for Direct Install, NJNG also offers financing options for SmartStart that will cover up to \$130,000 per year.



Direct Install: Financing Option



- Questions? Contact:

Jerry Ryan

Energy Efficiency Operations Manager

New Jersey Natural Gas

732-433-4362 (cell)

732 378 4920 (office)

jryan@njng.com

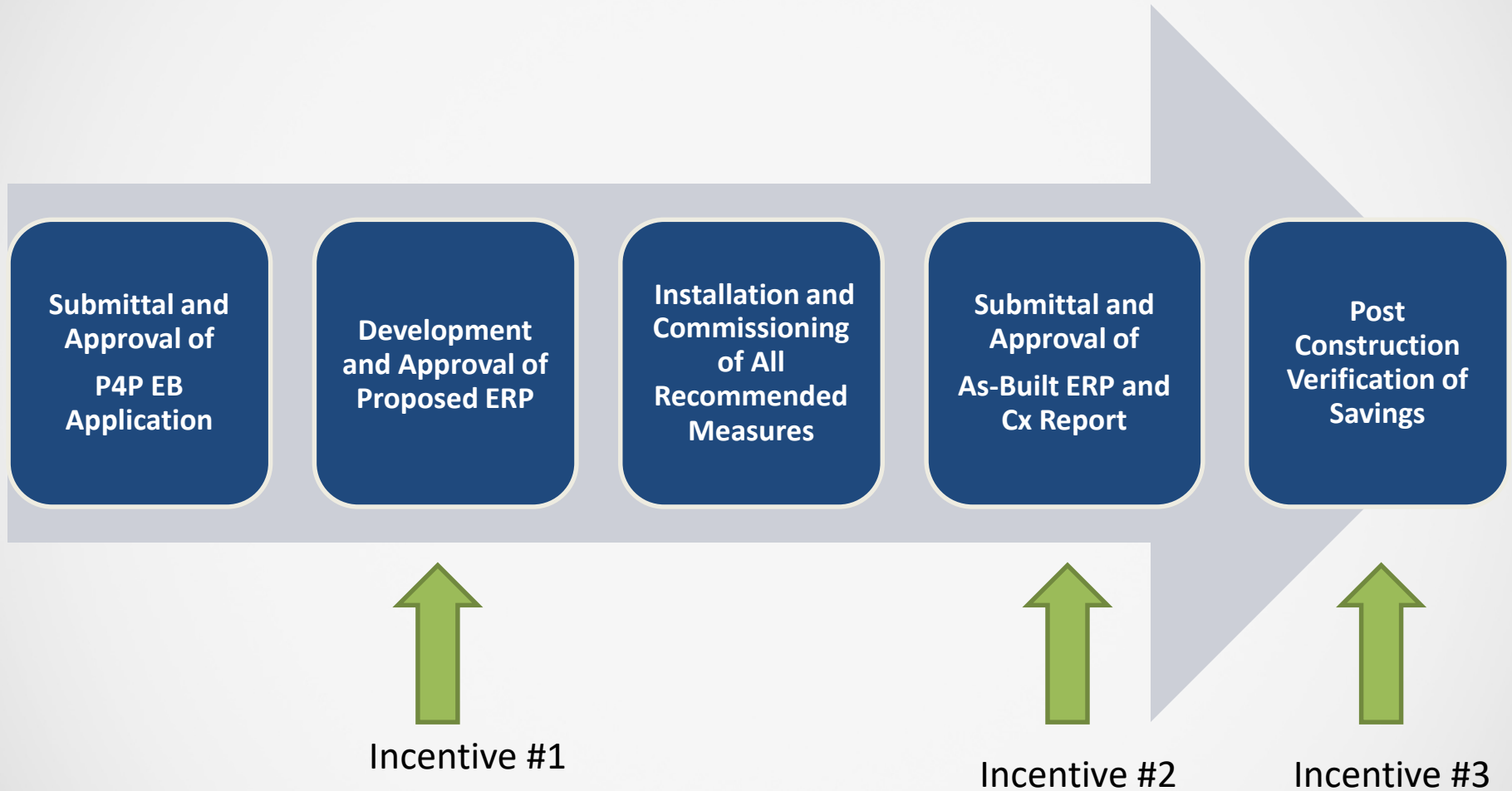


P4P Existing Buildings: Overview



- Open to Commercial and Industrial facilities with annual peak demand of at least 200 kW in previous year
- Minimum savings 15% from existing energy use
- Must have at least two unique measures per project
- No more than 50% of total savings may come from lighting measures
 - Lighting savings up to 70% may be considered with minimum savings target increasing up to 35%

P4P EB: Process



P4P EB: Incentives



Incentive #1: Energy Reduction Plan			
Incentive Amount:		\$0.15	per sq ft
Minimum Incentive:		\$7,500	
Maximum Incentive:		\$50,000	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

Recommended NJCEP Incentives per Building



Marlboro Township BOE	SmartStart	Direct Install	Pay For Performance	SREC Registration Program (SRP) for potential Solar Projects*
Administration Building	X	X		
Annex Building & Grounds				
Ashler Holmes Elementary	X	X		X
David C. Abbott ELC	X	X**	X	X
Frank Defino Central Elementary	X	X**		X
Frank J. Dugan Elementary	X	X		X
Marlboro Elementary School	X	X		X
Marlboro Memorial Middle School	X			X
Marlboro Middle School	X		X	X
Robertsville Elementary School	X	X		X
Transportation Building	X	X		

* These buildings have a *high potential* for the implementation of a PV system. The SREC registration program is provided to register produced SRECs and is not an incentive or rebate program.

** Eligible as of July 1, 2018 for Direct Install due to FY 19 updates. Draft Report does not indicate this eligibility because delivered prior in FY18.

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

Office: 609-777-3338

Cell: 732-330-2419

ESIP@bpu.nj.gov

Questions



?



FOR MORE INFORMATION

Visit NJCleanEnergy.com

Call (866) NJSMART

Jim Friedl

Outreach Manager

732-855-6543

jfriedl@trcsolutions.com