

New Jersey's Clean Energy Program

LGEA Exit Meeting for:
Municipality of Princeton

October 30, 2019

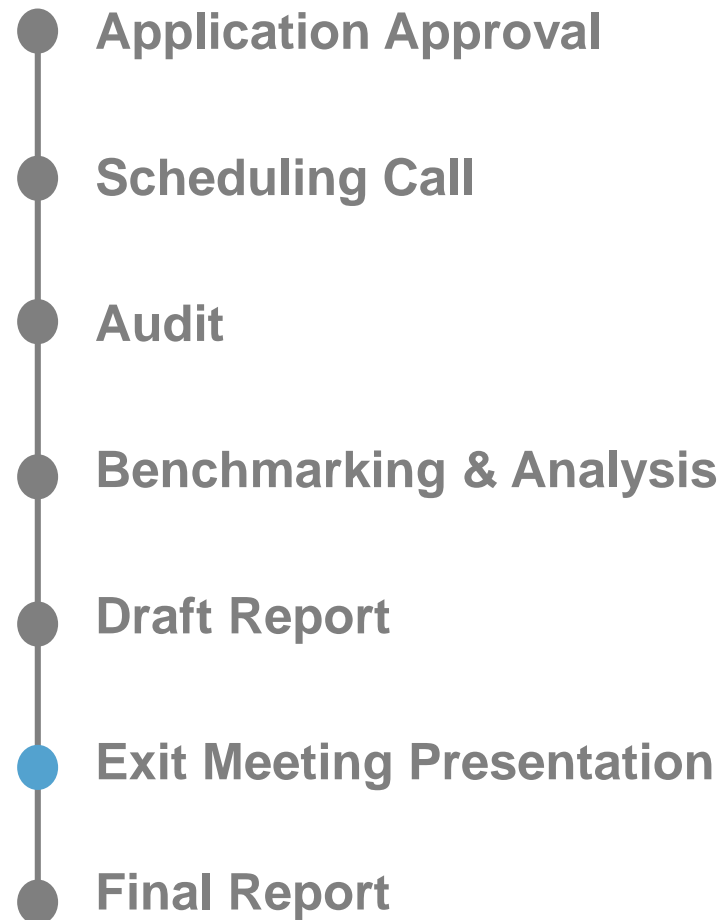
INTRODUCTIONS

- *Municipality of Princeton*
 - Dan Van Mater– Director of Public Works
 - Marc Dashield – Administrator
 - Christine Symington – Sustainable Princeton, Program Director
- *NJ Clean Energy Program*
 - Moussa Traore – TRC Auditor
 - Sarah Walters – TRC Account Manager
 - Tony O'Donnell– TRC Outreach Manager
 - Michelle Rossi – ESIP Coordinator
 - 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
- Questions regarding the draft audit report
- Overview of NJCEP equipment incentives
- Next steps for the Municipality of Princeton

LGEA PROCESS



BENCHMARKING

ENERGY STAR® Statement of Energy Performance

N/A Mercer Engine Company #3

Primary Property Type: Fire Station
Gross Floor Area (ft²): 13,246
Built: 1990

For Year Ending: December 31, 2018
Date Generated: August 02, 2019

ENERGY STAR® Score: 1

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 Mercer Engine Company #3 367 Witherspoon Street Princeton, New Jersey 08540	Property Owner Municipality of Princeton One Monument Drive Princeton, NJ 08540	Primary Contact Robert Hough One Monument Drive Princeton, NJ 08540 6096882566 mough@princetonnj.gov
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Property ID: 6858126

Energy Conservation and Energy Use Intensity (EUI)

Site EUI 80.2 kBtu/ft²	Actual Energy by Fuel Natural Gas (kBtu) 729,341 (59%) Electric - Grid (kBtu) 332,737 (31%)	National Median Comparison National Median Site EUI (kBtu/ft²) 78.1 National Median Source EUI (kBtu/ft²) 124.9 % Diff from National Median Source EUI 3% Annual Emissions Greenhouse Gas (tCO2e/year) 102
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Source EUI
128.1 kBtu/ft²

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

Professional Engineer Stamp (if applicable)

Site EUI
80.2 kBtu/ft²

Source EUI
128.1 kBtu/ft²

National Median Comparison
National Median Site EUI (kBtu/ft²) 78.1
National Median Source EUI (kBtu/ft²) 124.9
% Diff from National Median Source EUI 3%

Building Name	ENERGY STAR® Score
Municipal Building	9
Monument Hall	53
Princeton Hook & Ladder, Public Works Garage	N/A
Princeton Engine Co. #1	N/A
Mercer Engine Co. #3	N/A
Spring St. Parking Garage	N/A
Suzanne Patterson Senior Center	N/A
Rec. Bldg.Pool Complex, & IT Building	N/A
Public Works Trailer	N/A

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.

SITE VISIT & UTILITY ANALYSIS

Overview of Systems, Baseline & Existing Conditions:

- Lighting System
- HVAC and Mechanical Systems
- Plug Load Equipment
- Food Service and Refrigeration Equipment

Utility Consumption:

- Electric Consumption and Costs
- Natural Gas Consumption and Costs

Sites Visited/Analyzed

- Municipal Building
- Monument Hall
- Princeton Hook & Ladder, Public Works Garage
- Princeton Engine Co. #1
- Mercer Engine Co. #3
- Spring St. Parking Garage
- Suzanne Patterson Senior Center
- Recreation Building, Pool Complex, IT Building
- Public Works Trailer

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	347,545	61.0	-55.0	\$42,562.48	\$125,259.54	\$16,006.00	\$109,253.54	2.6	343,531
Install LED Fixtures	30,863	6.5	0.0	\$4,322.92	\$43,163.01	\$1,680.00	\$41,483.01	9.6	31,079
Retrofit Fluorescent Fixtures with LED Lamps and Drivers	19,899	3.5	-4.1	\$2,439.75	\$7,217.52	\$891.00	\$6,326.52	2.6	19,560
Retrofit Fixtures with LED Lamps	292,759	50.6	-50.6	\$35,311.46	\$70,751.32	\$13,435.00	\$57,316.32	1.6	288,878
Install LED Exit Signs	4,024	0.4	-0.3	\$488.35	\$4,127.69	\$0.00	\$4,127.69	8.5	4,014
Lighting Control Measures	76,062	11.4	-13.7	\$9,057.78	\$52,550.00	\$9,422.00	\$43,128.00	4.8	74,994
Install Occupancy Sensor Lighting Controls	57,426	9.3	-12.0	\$6,976.77	\$39,500.00	\$3,087.00	\$36,413.00	5.2	56,421
Install High/Low Lighting Controls	18,636	2.1	-1.6	\$2,081.01	\$13,050.00	\$6,335.00	\$6,715.00	3.2	18,573
Motor Upgrades	642	0.3	0.0	\$98.25	\$4,234.77	\$0.00	\$4,234.77	43.1	647
Premium Efficiency Motors	642	0.3	0.0	\$98.25	\$4,234.77	\$0.00	\$4,234.77	43.1	647
Variable Frequency Drive (VFD) Measures	220,825	56.1	0.0	\$27,166.76	\$129,677.37	\$13,000.00	\$116,677.37	4.3	222,369
Install VFD on Variable Air Volume (VAV) Fans	186,034	47.0	0.0	\$22,074.50	\$78,853.79	\$10,800.00	\$68,053.79	3.1	187,335
Install VFDs on Constant Volume (CV) Fans	29,362	8.2	0.0	\$4,331.20	\$40,299.23	\$2,200.00	\$38,099.23	8.8	29,567
Install VFDs on Heating Water Pumps	5,429	0.9	0.0	\$761.06	\$10,524.35	\$0.00	\$10,524.35	13.8	5,466
Electric Unitary HVAC Measures	26,471	12.3	0.0	\$3,601.14	\$169,873.45	\$3,864.00	\$166,009.45	46.1	26,656
Install High Efficiency Air Conditioning Units	23,449	11.1	0.0	\$3,140.80	\$156,894.95	\$3,312.00	\$153,582.95	48.9	23,613
Install High Efficiency Heat Pumps	3,022	1.2	0.0	\$460.34	\$12,978.50	\$552.00	\$12,426.50	27.0	3,043
Gas Heating (HVAC/Process) Replacement	0	0.0	154.9	\$1,535.48	\$133,130.50	\$11,953.15	\$121,177.35	78.9	18,140
Install High Efficiency Hot Water Boilers	0	0.0	103.9	\$1,033.62	\$116,454.71	\$8,753.15	\$107,701.56	104.2	12,165
Install High Efficiency Furnaces	0	0.0	51.0	\$501.86	\$16,675.79	\$3,200.00	\$13,475.79	26.9	5,974
Domestic Water Heating Upgrade	7,720	0.0	48.0	\$1,453.48	\$4,527.51	\$50.00	\$4,477.51	3.1	13,399
Install High Efficiency Gas-Fired Water Heater	0	0.0	9.1	\$82.87	\$4,219.20	\$50.00	\$4,169.20	50.3	1,070
Install Low-Flow DHW Devices	7,720	0.0	38.9	\$1,370.61	\$308.31	\$0.00	\$308.31	0.2	12,329
Plug Load Equipment Control - Vending Machine	5,521	0.6	0.0	\$694.80	\$1,150.00	\$150.00	\$1,000.00	1.4	5,559
Vending Machine Control	5,521	0.6	0.0	\$694.80	\$1,150.00	\$150.00	\$1,000.00	1.4	5,559
TOTALS	684,785	141.7	134.3	\$86,170.17	\$620,403.14	\$54,445.15	\$565,957.99	6.6	705,294

* - 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

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		345,447	60.7	-55.0	\$42,287.49	\$120,067.63	\$15,506.00	\$104,561.63	2.5	341,424
ECM 1	Install LED Fixtures	29,002	6.2	0.0	\$4,074.83	\$38,333.18	\$1,180.00	\$37,153.18	9.1	29,205
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	19,899	3.5	-4.1	\$2,439.75	\$7,217.52	\$891.00	\$6,326.52	2.6	19,560
ECM 3	Retrofit Fixtures with LED Lamps	292,759	50.6	-50.6	\$35,311.46	\$70,751.32	\$13,435.00	\$57,316.32	1.6	288,878
ECM 4	Install LED Exit Signs	3,788	0.4	-0.3	\$461.45	\$3,765.61	\$0.00	\$3,765.61	8.2	3,781
Lighting Control Measures		75,282	11.0	-13.5	\$8,917.78	\$49,940.00	\$9,282.00	\$40,658.00	4.6	74,228
ECM 5	Install Occupancy Sensor Lighting Controls	56,752	8.9	-11.9	\$6,851.17	\$37,340.00	\$2,947.00	\$34,393.00	5.0	55,759
ECM 6	Install High/Low Lighting Controls	18,530	2.1	-1.6	\$2,066.61	\$12,600.00	\$6,335.00	\$6,265.00	3.0	18,469
Variable Frequency Drive (VFD) Measures		202,642	51.8	0.0	\$24,563.18	\$91,262.36	\$12,080.00	\$79,182.36	3.2	204,059
ECM 7	Install VFD on Variable Air Volume (VAV) Fans	186,034	47.0	0.0	\$22,074.50	\$78,853.79	\$10,800.00	\$68,053.79	3.1	187,335
ECM 8	Install VFDs on Constant Volume (CV) Fans	16,608	4.8	0.0	\$2,488.68	\$12,408.57	\$1,280.00	\$11,128.57	4.5	16,725
Domestic Water Heating Upgrade		7,720	0.0	38.9	\$1,370.61	\$308.31	\$0.00	\$308.31	0.2	12,329
ECM 9	Install Low-Flow DHW Devices	7,720	0.0	38.9	\$1,370.61	\$308.31	\$0.00	\$308.31	0.2	12,329
Plug Load Equipment Control - Vending Machine		5,521	0.6	0.0	\$694.80	\$1,150.00	\$150.00	\$1,000.00	1.4	5,559
ECM 10	Vending Machine Control	5,521	0.6	0.0	\$694.80	\$1,150.00	\$150.00	\$1,000.00	1.4	5,559
TOTALS		636,612	124.1	-29.6	\$77,833.86	\$262,728.30	\$37,018.00	\$225,710.30	2.9	637,600

* - 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).

MUNICIPAL BUILDING

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			193,798	27.1	-38	\$22,204	\$43,641	\$8,179	\$35,462	1.6	190,691
ECM 1	Install LED Fixtures	Yes	9,345	1.5	0	\$1,086	\$8,654	\$950	\$7,704	7.1	9,410
ECM 2	Retrofit Fixtures with LED Lamps	Yes	184,454	25.7	-38	\$21,118	\$34,987	\$7,229	\$27,758	1.3	181,281
Lighting Control Measures			45,395	5.1	-9	\$5,196	\$18,369	\$1,547	\$16,822	3.2	44,601
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	38,822	4.5	-8	\$4,444	\$15,894	\$1,547	\$14,347	3.2	38,143
ECM 4	Install High/Low Lighting Controls	Yes	6,573	0.6	-1	\$752	\$2,475	\$0	\$2,475	3.3	6,458
Motor Upgrades			0	0.0	0	\$0	\$0	\$0	\$0	0.0	0
ECM 0	Premium Efficiency Motors	Yes	0	0.0	0	\$0	\$0	\$0	\$0	0.0	0
Variable Frequency Drive (VFD) Measures			169,385	42.1	0	\$19,687	\$57,298	\$10,800	\$46,498	2.4	170,570
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	Yes	169,385	42.1	0	\$19,687	\$57,298	\$10,800	\$46,498	2.4	170,570
Electric Unitary HVAC Measures			11,228	2.9	0	\$1,305	\$66,009	\$0	\$66,009	50.6	11,307
ECM 6	Install High Efficiency Air Conditioning Units	No	11,228	2.9	0	\$1,305	\$66,009	\$0	\$66,009	50.6	11,307
Domestic Water Heating Upgrade			1,668	0.0	8	\$258	\$115	\$0	\$115	0.4	2,569
ECM 7	Install Low-Flow DHW Devices	Yes	1,668	0.0	8	\$258	\$115	\$0	\$115	0.4	2,569
Food Service & Refrigeration Measures			3,566	0.4	0	\$414	\$690	\$100	\$590	1.4	3,591
ECM 8	Vending Machine Control	Yes	3,566	0.4	0	\$414	\$690	\$100	\$590	1.4	3,591
TOTALS (COST EFFECTIVE MEASURES)			413,813	74.8	-40	\$47,759	\$120,112	\$20,626	\$99,486	2.1	412,022
TOTALS (ALL MEASURES)			425,041	77.7	-40	\$49,064	\$186,121	\$20,626	\$165,495	3.4	423,328

MONUMENT HALL

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			19,816	5.1	-2	\$2,821	\$15,513	\$568	\$14,945	5.3	19,709
ECM 1	Install LED Fixtures	Yes	2,594	0.4	0	\$372	\$4,824	\$130	\$4,694	12.6	2,612
ECM 2	Retrofit Fixtures with LED Lamps	Yes	17,222	4.7	-2	\$2,449	\$10,690	\$438	\$10,252	4.2	17,097
Lighting Control Measures			6,609	2.0	-1	\$934	\$11,366	\$420	\$10,946	11.7	6,493
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	5,417	1.7	-1	\$766	\$9,566	\$420	\$9,146	11.9	5,323
ECM 4	Install High/Low Lighting Controls	Yes	1,192	0.3	0	\$168	\$1,800	\$0	\$1,800	10.7	1,171
Variable Frequency Drive (VFD) Measures			28,071	7.9	0	\$4,026	\$46,511	\$800	\$45,711	11.4	28,267
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	Yes	16,649	4.9	0	\$2,388	\$21,556	\$0	\$21,556	9.0	16,765
ECM 6	Install VFDs on Constant Volume (CV) Fans	No	11,422	3.0	0	\$1,638	\$24,955	\$800	\$24,155	14.7	11,502
Electric Unitary HVAC Measures			8,173	5.4	0	\$1,172	\$63,661	\$2,576	\$61,085	52.1	8,230
ECM 7	Install High Efficiency Air Conditioning Units	No	7,694	5.1	0	\$1,104	\$61,262	\$2,484	\$58,778	53.3	7,748
ECM 8	Install High Efficiency Heat Pumps	No	479	0.3	0	\$69	\$2,399	\$92	\$2,307	33.6	482
Gas Heating (HVAC/Process) Replacement			0	0.0	43	\$429	\$14,591	\$2,800	\$11,791	27.5	5,060
ECM 9	Install High Efficiency Furnaces	No	0	0.0	43	\$429	\$14,591	\$2,800	\$11,791	27.5	5,060
Domestic Water Heating Upgrade			3,058	0.0	0	\$439	\$79	\$0	\$79	0.2	3,080
ECM 10	Install Low-Flow DHW Devices	Yes	3,058	0.0	0	\$439	\$79	\$0	\$79	0.2	3,080
Food Service & Refrigeration Measures			1,954	0.2	0	\$280	\$460	\$50	\$410	1.5	1,968
ECM 11	Vending Machine Control	Yes	1,954	0.2	0	\$280	\$460	\$50	\$410	1.5	1,968
TOTALS (COST EFFECTIVE MEASURES)			48,086	12.2	-3	\$6,863	\$48,975	\$1,038	\$47,937	7.0	48,015
TOTALS (ALL MEASURES)			67,681	20.6	40	\$10,102	\$152,182	\$7,214	\$144,968	14.4	72,807

PRINCETON HOOK & LADDER, PUBLIC WORKS GARAGE



#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			21,848	3.3	-4	\$2,488	\$9,247	\$1,088	\$8,159	3.3	21,500
ECM 1	Install LED Fixtures	No	1,076	0.2	0	\$125	\$2,898	\$300	\$2,598	20.9	1,084
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	16,634	2.0	-4	\$1,892	\$4,968	\$556	\$4,412	2.3	16,335
ECM 3	Retrofit Fixtures with LED Lamps	Yes	3,902	1.2	-1	\$445	\$1,019	\$232	\$787	1.8	3,848
ECM 4	Install LED Exit Signs	No	237	0.0	0	\$27	\$362	\$0	\$362	13.5	232
Lighting Control Measures			5,488	1.0	-1	\$624	\$4,050	\$350	\$3,700	5.9	5,390
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	5,488	1.0	-1	\$624	\$4,050	\$350	\$3,700	5.9	5,390
Domestic Water Heating Upgrade			2,502	0.0	14	\$422	\$57	\$0	\$57	0.1	4,186
ECM 6	Install Low-Flow DHW Devices	Yes	2,502	0.0	14	\$422	\$57	\$0	\$57	0.1	4,186
TOTALS (COST EFFECTIVE MEASURES)			28,526	4.2	9	\$3,382	\$10,094	\$1,138	\$8,956	2.6	29,760
TOTALS (ALL MEASURES)			29,838	4.4	9	\$3,534	\$13,354	\$1,438	\$11,916	3.4	31,076

PRINCETON ENGINE Co. #1

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			8,480	4.5	-2	\$1,580	\$3,212	\$349	\$2,863	1.8	8,328
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	2,512	1.4	-1	\$468	\$1,992	\$295	\$1,697	3.6	2,467
ECM 2	Retrofit Fixtures with LED Lamps	Yes	5,590	3.1	-1	\$1,042	\$930	\$54	\$876	0.8	5,489
ECM 3	Install LED Exit Signs	Yes	378	0.0	0	\$71	\$290	\$0	\$290	4.1	372
Lighting Control Measures			674	0.4	0	\$126	\$2,160	\$140	\$2,020	16.1	662
ECM 4	Install Occupancy Sensor Lighting Controls	No	674	0.4	0	\$126	\$2,160	\$140	\$2,020	16.1	662
Motor Upgrades			32	0.0	0	\$6	\$400	\$0	\$400	66.6	32
ECM 5	Premium Efficiency Motors	No	32	0.0	0	\$6	\$400	\$0	\$400	66.6	32
Electric Unitary HVAC Measures			600	0.7	0	\$113	\$4,355	\$0	\$4,355	38.6	604
ECM 6	Install High Efficiency Air Conditioning Units	No	600	0.7	0	\$113	\$4,355	\$0	\$4,355	38.6	604
ECM 0	Install High Efficiency Heat Pumps	Yes	0	0.0	0	\$0	\$0	\$0	\$0	0.0	0
ECM 0	Install High Efficiency PTAC/PTHP	Yes	0	0.0	0	\$0	\$0	\$0	\$0	0.0	0
Gas Heating (HVAC/Process) Replacement			0	0.0	30	\$269	\$51,884	\$3,878	\$48,006	178.7	3,467
ECM 7	Install High Efficiency Hot Water Boilers	No	0	0.0	30	\$269	\$51,884	\$3,878	\$48,006	178.7	3,467
Domestic Water Heating Upgrade			0	0.0	15	\$135	\$4,234	\$50	\$4,184	31.1	1,736
ECM 8	Install High Efficiency Gas-Fired Water Heater	No	0	0.0	9	\$83	\$4,219	\$50	\$4,169	50.3	1,070
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	6	\$52	\$14	\$0	\$14	0.3	667
TOTALS (COST EFFECTIVE MEASURES)			8,480	4.5	4	\$1,632	\$3,226	\$349	\$2,877	1.8	8,994
TOTALS (ALL MEASURES)			9,786	5.5	42	\$2,228	\$66,244	\$4,417	\$61,827	27.8	14,829

MERCER ENGINE Co. #3

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$) *	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			24,495	5.2	-5	\$3,334	\$6,816	\$1,500	\$5,316	1.6	24,057
ECM 1	Retrofit Fixtures with LED Lamps	Yes	23,549	5.1	-5	\$3,205	\$6,092	\$1,500	\$4,592	1.4	23,128
ECM 2	Install LED Exit Signs	Yes	946	0.1	0	\$129	\$724	\$0	\$724	5.6	929
Lighting Control Measures			3,771	0.8	-1	\$513	\$5,040	\$315	\$4,725	9.2	3,703
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	3,665	0.8	-1	\$499	\$4,590	\$315	\$4,275	8.6	3,599
ECM 4	Install High/Low Lighting Controls	No	106	0.0	0	\$14	\$450	\$0	\$450	31.3	104
Motor Upgrades			89	0.0	0	\$12	\$456	\$0	\$456	36.9	90
ECM 5	Premium Efficiency Motors	No	89	0.0	0	\$12	\$456	\$0	\$456	36.9	90
Variable Frequency Drive (VFD) Measures			11,420	3.1	0	\$1,581	\$12,428	\$600	\$11,828	7.5	11,500
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	6,639	2.3	0	\$919	\$4,660	\$600	\$4,060	4.4	6,685
ECM 7	Install VFDs on Heating Water Pumps	No	4,782	0.8	0	\$662	\$7,768	\$0	\$7,768	11.7	4,815
Gas Heating (HVAC/Process) Replacement			0	0.0	46	\$505	\$34,756	\$3,000	\$31,756	62.9	5,435
ECM 8	Install High Efficiency Hot Water Boilers	No	0	0.0	46	\$505	\$34,756	\$3,000	\$31,756	62.9	5,435
Domestic Water Heating Upgrade			0	0.0	11	\$124	\$29	\$0	\$29	0.2	1,333
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	11	\$124	\$29	\$0	\$29	0.2	1,333
TOTALS (COST EFFECTIVE MEASURES)			34,799	8.2	5	\$4,876	\$16,095	\$2,415	\$13,680	2.8	35,674
TOTALS (ALL MEASURES)			39,776	9.1	52	\$6,069	\$59,526	\$5,415	\$54,111	8.9	46,118

SPRING ST. PARKING GARAGE

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			42,596	4.6	0	\$4,533	\$10,416	\$1,972	\$8,444	1.9	42,894
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	753	0.1	0	\$80	\$257	\$40	\$217	2.7	759
ECM 2	Retrofit Fixtures with LED Lamps	Yes	39,379	4.2	0	\$4,191	\$7,407	\$1,932	\$5,475	1.3	39,655
ECM 3	Install LED Exit Signs	Yes	2,463	0.3	0	\$262	\$2,752	\$0	\$2,752	10.5	2,481
Lighting Control Measures			10,765	1.1	0	\$1,146	\$8,325	\$6,335	\$1,990	1.7	10,840
ECM 4	Install High/Low Lighting Controls	Yes	10,765	1.1	0	\$1,146	\$8,325	\$6,335	\$1,990	1.7	10,840
Electric Unitary HVAC Measures			172	0.1	0	\$18	\$3,382	\$184	\$3,198	175.1	173
ECM 5	Install High Efficiency Heat Pumps	No	172	0.1	0	\$18	\$3,382	\$184	\$3,198	175.1	173
TOTALS (COST EFFECTIVE MEASURES)			53,361	5.7	0	\$5,679	\$18,741	\$8,307	\$10,434	1.8	53,734
TOTALS (ALL MEASURES)			53,533	5.8	0	\$5,697	\$22,123	\$8,491	\$13,632	2.4	53,907

SUZANNE PATTERSON SENIOR CENTER

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			4,811	1.2	-1	\$750	\$3,374	\$522	\$2,852	3.8	4,748
ECM 1	Install LED Fixtures	No	785	0.1	0	\$124	\$1,932	\$200	\$1,732	14.0	790
ECM 2	Retrofit Fixtures with LED Lamps	Yes	4,026	1.0	-1	\$626	\$1,442	\$322	\$1,120	1.8	3,958
Lighting Control Measures			1,966	0.5	0	\$306	\$1,350	\$140	\$1,210	4.0	1,930
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	1,966	0.5	0	\$306	\$1,350	\$140	\$1,210	4.0	1,930
Variable Frequency Drive (VFD) Measures			9,970	2.5	0	\$1,570	\$7,748	\$680	\$7,068	4.5	10,039
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	9,970	2.5	0	\$1,570	\$7,748	\$680	\$7,068	4.5	10,039
Electric Unitary HVAC Measures			5,319	2.5	0	\$837	\$26,241	\$920	\$25,321	30.2	5,356
ECM 5	Install High Efficiency Air Conditioning Units	No	2,947	1.7	0	\$464	\$19,043	\$644	\$18,399	39.7	2,967
ECM 6	Install High Efficiency Heat Pumps	No	2,372	0.8	0	\$373	\$7,198	\$276	\$6,922	18.5	2,388
Gas Heating (HVAC/Process) Replacement			0	0.0	29	\$270	\$20,997	\$1,875	\$19,122	70.8	3,380
ECM 7	Install High Efficiency Hot Water Boilers	No	0	0.0	21	\$197	\$18,913	\$1,475	\$17,438	88.5	2,466
ECM 8	Install High Efficiency Furnaces	No	0	0.0	8	\$73	\$2,084	\$400	\$1,684	23.0	914
Domestic Water Heating Upgrade			491	0.0	0	\$77	\$14	\$0	\$14	0.2	494
ECM 9	Install Low-Flow DHW Devices	Yes	491	0.0	0	\$77	\$14	\$0	\$14	0.2	494
TOTALS (COST EFFECTIVE MEASURES)			16,452	4.1	-1	\$2,579	\$10,554	\$1,142	\$9,412	3.6	16,422
TOTALS (ALL MEASURES)			22,556	6.7	28	\$3,810	\$59,725	\$4,137	\$55,587	14.6	25,948

RECREATION BUILDING & POOL COMPLEX

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			29,775	9.3	-3	\$4,541	\$32,105	\$1,671	\$30,434	6.7	29,667
ECM 1	Install LED Fixtures	Yes	17,064	4.3	0	\$2,617	\$24,856	\$100	\$24,756	9.5	17,183
ECM 2	Retrofit Fixtures with LED Lamps	Yes	12,712	5.0	-3	\$1,924	\$7,249	\$1,571	\$5,678	3.0	12,484
Lighting Control Measures			1,205	0.4	0	\$182	\$1,350	\$105	\$1,245	6.8	1,183
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	1,205	0.4	0	\$182	\$1,350	\$105	\$1,245	6.8	1,183
Motor Upgrades			521	0.2	0	\$80	\$3,379	\$0	\$3,379	42.3	525
ECM 4	Premium Efficiency Motors	No	521	0.2	0	\$80	\$3,379	\$0	\$3,379	42.3	525
Variable Frequency Drive (VFD) Measures			1,978	0.5	0	\$303	\$5,692	\$120	\$5,572	18.4	1,992
ECM 5	Install VFDs on Constant Volume (CV) Fans	No	1,332	0.4	0	\$204	\$2,936	\$120	\$2,816	13.8	1,341
ECM 6	Install VFDs on Heating Water Pumps	No	647	0.1	0	\$99	\$2,756	\$0	\$2,756	27.8	651
Electric Unitary HVAC Measures			346	0.3	0	\$53	\$1,688	\$0	\$1,688	31.8	348
ECM 7	Install High Efficiency Air Conditioning Units	No	346	0.3	0	\$53	\$1,688	\$0	\$1,688	31.8	348
Gas Heating (HVAC/Process) Replacement			0	0.0	7	\$63	\$10,902	\$400	\$10,502	166.5	798
ECM 8	Install High Efficiency Hot Water Boilers	No	0	0.0	7	\$63	\$10,902	\$400	\$10,502	166.5	798
TOTALS (COST EFFECTIVE MEASURES)			30,980	9.6	-3	\$4,723	\$33,455	\$1,776	\$31,679	6.7	30,850
TOTALS (ALL MEASURES)			33,825	10.6	4	\$5,223	\$55,115	\$2,296	\$52,819	10.1	34,513

PUBLIC WORKS TRAILER

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO ₂ e Emissions Reduction (lbs)
Lighting Upgrades			1,925	0.8	0	\$310	\$936	\$157	\$779	2.5	1,938
ECM 1	Retrofit Fixtures with LED Lamps	Yes	1,925	0.8	0	\$310	\$936	\$157	\$779	2.5	1,938
Lighting Control Measures			190	0.1	0	\$31	\$540	\$70	\$470	15.3	191
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	190	0.1	0	\$31	\$540	\$70	\$470	15.3	191
Electric Unitary HVAC Measures			634	0.4	0	\$102	\$4,538	\$184	\$4,354	42.6	638
ECM 3	Install High Efficiency Air Conditioning Units	No	634	0.4	0	\$102	\$4,538	\$184	\$4,354	42.6	638
TOTALS (COST EFFECTIVE MEASURES)			2,115	0.9	0	\$341	\$1,476	\$227	\$1,249	3.7	2,129
TOTALS (ALL MEASURES)			2,748	1.3	0	\$443	\$6,014	\$411	\$5,603	12.6	2,768

SOLAR ENERGY GENERATION POTENTIAL

	Municipal Bldg.	Monument Hall	Recreation Building
<i>Potential:</i>	HIGH	Medium	Medium
<i>System Potential: (kW)</i>	120	60	40
<i>Electric Generation: (kWh per year)</i>	142,965	71,487	47,655
<i>Displaced Cost: (per year)</i>	\$16,620	\$10,250	\$7,310

SREC Registration Program (SRP):

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

**Community Solar Energy Pilot
Program:**

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



ENERGY EFFICIENT BEST PRACTICES

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

See individual reports for specific EE practices by building

CLEAN ENERGY PROGRAM PORTFOLIO

ELIGIBLE SECTORS

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

INCENTIVE PROGRAMS

Equipment Rebates:

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

Whole Buildings:

- **Pay for Performance**

Energy Generation:

- Combined Heat and Power – Fuel Cells

OTHER PROGRAMS

Renewable Energy Generation:

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

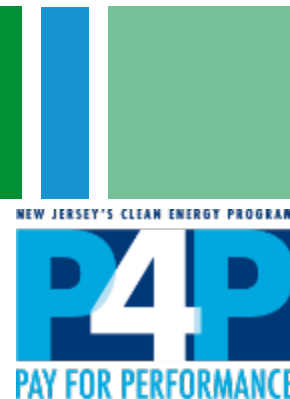
RECOMMENDED NJCEP INCENTIVES PER BUILDING

	Pay For Performance	Direct Install	SmartStart	CTEEP
Municipal Building	X		X	X
Monument Hall		X	X	X
Princeton Hook & Ladder, Public Works Garage		X	X	X
Princeton Engine Co. #1		X	X	X
Mercer Engine Co. #3		X	X	X
Spring St. Parking Garage		X	X	X
Suzanne Patterson Senior Center		X	X	X
Rec. Bldg., Pool Complex, IT Building		X	X	X
Public Works Trailer		X	X	X



PAY FOR PERFORMANCE

NJCleanEnergy.com/P4P



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

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

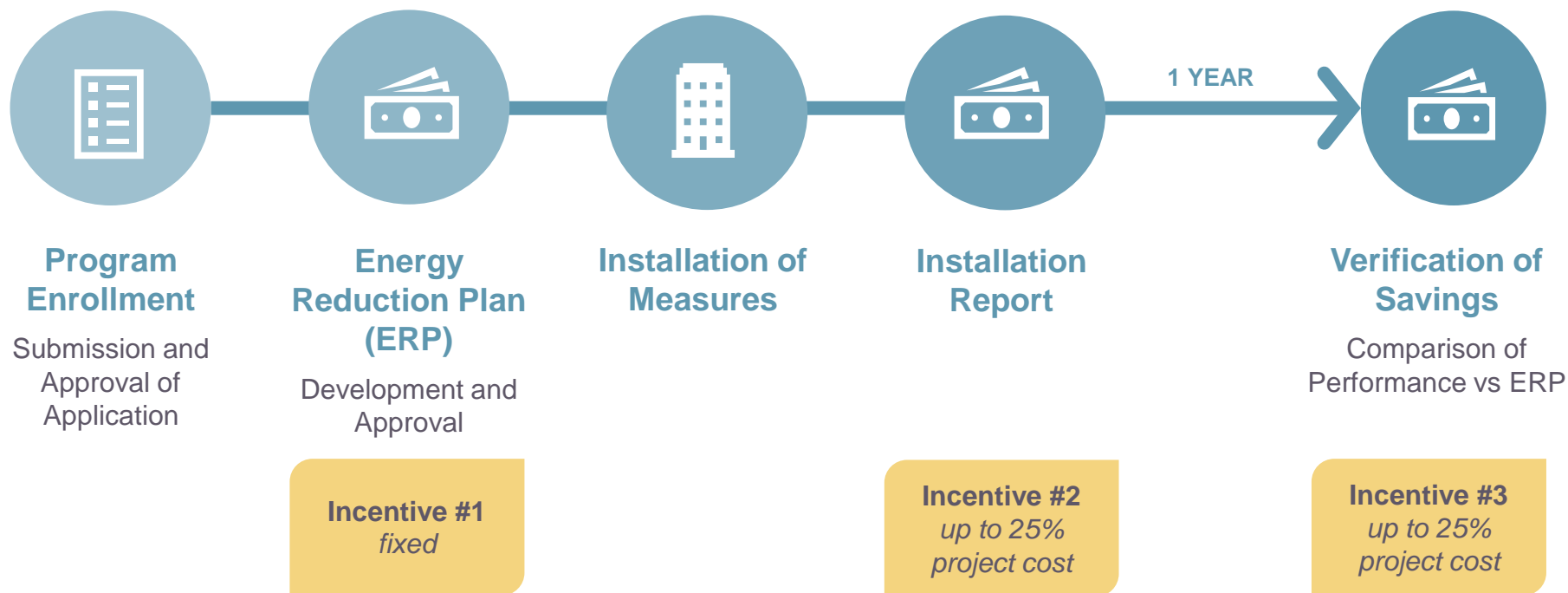
About: Customer choose from a network of pre-approved ***Participating Partners***

Incentives:

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

PAY FOR PERFORMANCE

NJCleanEnergy.com/P4P



DIRECT INSTALL

NJCleanEnergy.com/DI



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

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

About:

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

Incentives:

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

DIRECT INSTALL

NJCleanEnergy.com/DI

Facilities in Urban Enterprise Zones (UEZ), Opportunity Zones (OZ), municipalities, and K-12 public schools:

INCENTIVE FUNDING

Up to **80%** of installed cost is paid directly to the contractor

CUSTOMER

20% of installed cost

All other eligible facilities:

INCENTIVE FUNDING

Up to **70%** of installed cost is paid directly to the contractor

CUSTOMER

30% of installed cost



DIRECT INSTALL

NJCleanEnergy.com/DI

Participating Contractor

Tri-State Light & Energy, Inc.

Alan Rhode

610-789-1900 x226

asr@tsle.com



SMARTSTART

NJCleanEnergy.com/SSB

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

Qualifications: • All C&I customer types contributing into the Societal Benefits Charge (SBC)

About:

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

Incentives:

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



SMARTSTART

NJCleanEnergy.com/SSB

Prescriptive Incentives

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

Prescriptive Only:

**DOUBLE
INCENTIVES FOR
OZ/UEZ/ MUNI/K-12
PUBLIC SCHOOLS**

Custom Incentives

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



CUSTOMER TAILORED ENERGY EFFICIENCY PILOT

NJCleanEnergy.com/CTEEP

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

Qualifications:

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

About:

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

Incentives:

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

**SAME INCENTIVE
VALUES AS
SMARTSTART**



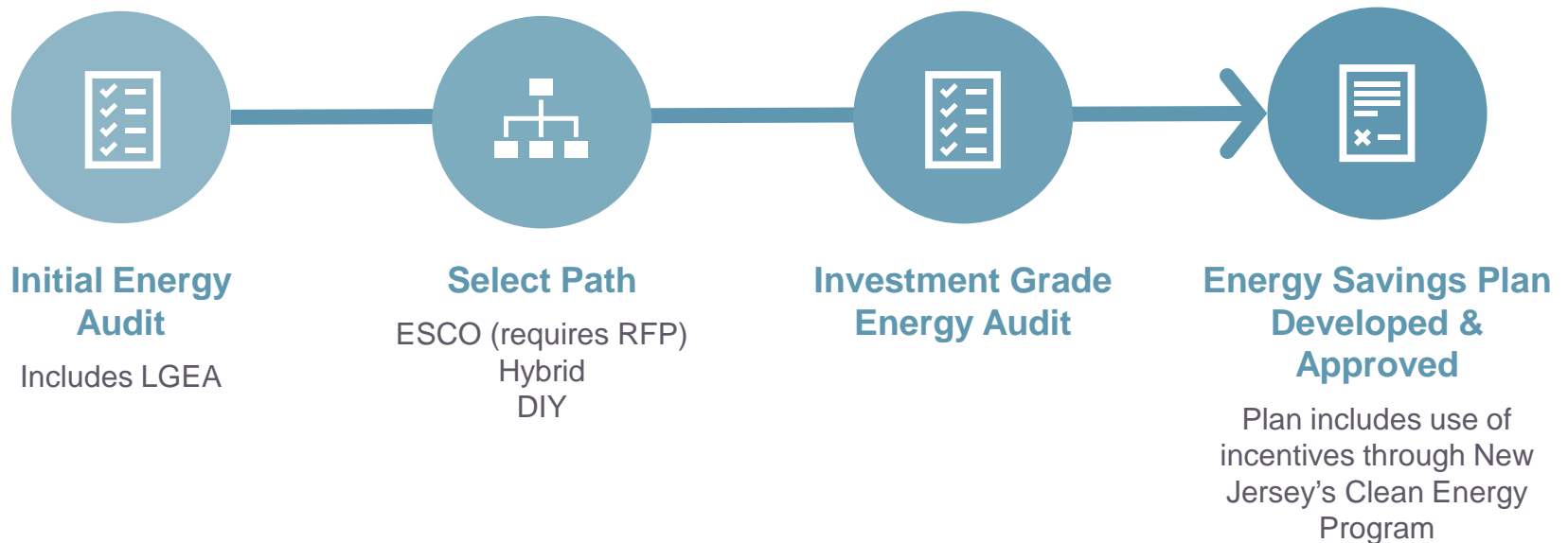
FINANCING MECHANISM: ESIP

ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

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



FINANCING MECHANISM: ESIP



ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

FOR MORE INFORMATION

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ESIP Coordinator

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ESIP@bpu.nj.gov

FOR MORE INFORMATION

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QUESTIONS

