



# LGEA Presentation

## Mendham Township School District

October 26, 2021

New Jersey's Clean Energy Program

Lighting the way to New Jersey's Clean Energy Future

# INTRODUCTIONS

- Mendham Township School District
  - Donna Mosner School Business Administrator
  - Salvatore Constantino, Ed.D. Superintendent

- NJ Clean Energy Program
  - Sarah Walters LGEA Project Manager
  - Moussa Traore LGEA Lead Auditor
  - Nick Nocco LGEA Project Auditor
  - Meredith Coley LGEA Account Manager
  - Nauman Khurshid NJCEP Outreach Account Manager
  - Michelle Rossi ESIP Coordinator (BPU)



# Agenda

- The audit process overview
- Energy use & existing conditions
- Review of Energy Conservation Measures (ECMs) identified & other recommendations
- Energy Savings Improvement Program (ESIP)
- C&I Transition of EE Programs
- Questions regarding the draft audit report
- Next steps for Mendham Township School District



# 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 and Refrigeration Equipment

### **Utility Consumption:**

- Electric Consumption and Costs
- Natural Gas Consumption and Costs

## **Sites Visited/Analyzed**

- Mendham Township Board of Education Elementary School
- Mendham Township Board of Education Middle School



# UTILITY BREAKOUT

Percent of Total Annual Energy Costs

#### Pre & Post Implementation Cost





## Benchmarking



Site Name	ENERGY STAR <sup>®</sup> Score
Mendham Township BOE – Elementary School	61
Mendham Township BOE – Middle School	60

ENERGY STAR<sup>®</sup> scores are percentile ranking from 1 (least efficient) to 100 (most efficient). It compares your building's energy performance to similar buildings nationwide.

71.4

113.5

-11%

# Benchmarking





# ALL OPPORTUNITIES







# 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 (Ibs)
Lighting	Upgrades	9,362	0.4	-0.2	\$1,312	\$4,661	\$678	\$3,983	3.0	9,403
ECM 1	Install LED Fixtures	8,351	0.0	0.0	\$1,167	\$3,652	\$550	\$3,102	2.7	8,410
ECM 2	Retrofit Fixtures with LED Lamps	1,011	0.4	-0.2	\$145	\$1,009	\$128	\$881	6.1	993
Lighting	Control Measures	50,831	10.4	-10.6	\$7,188	\$47,798	\$15,285	\$32,513	4.5	49,942
ECM 3	Install Occupancy Sensor Lighting Controls	38,238	8.3	-8.0	\$5 <i>,</i> 403	\$31,598	\$3,735	\$27,863	5.2	37,570
ECM 4	Install High/Low Lighting Controls	12,593	2.1	-2.6	\$1,785	\$16,200	\$11,550	\$4,650	2.6	12,373
Variable	Frequency Drive (VFD) Measures	152,490	62.2	41.7	\$22,290	\$215,317	\$22,700	\$192,617	8.6	158,436
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	10,537	4.4	0.0	\$1,571	\$7,041	\$1,200	\$5,841	3.7	10,611
ECM 6	Install VFDs on Constant Volume (CV) Fans	134,649	56.8	0.0	\$19,352	\$190,919	\$20,775	\$170,144	8.8	135,590
ECM 7	Install VFDs on Kitchen Hood Fan Motors	3,957	0.0	41.7	\$909	\$5,706	\$125	\$5,581	6.1	8,865
ECM 8	Install VFDs on Water Supply Pump	3,346	1.0	0.0	\$458	\$11,652	\$600	\$11,052	24.1	3,370
Electric	Unitary HVAC Measures	43,213	72.0	46.0	\$6 <i>,</i> 478	\$680,846	\$48,437	\$632,410	97.6	48,906
ECM 9	Install High Efficiency Air Conditioning Units	43,213	72.0	46.0	\$6,478	\$680,846	\$48,437	\$632 <i>,</i> 410	97.6	48,906
Gas Hea	ting (HVAC/Process) Replacement	0	0.0	67.3	\$561	\$51,973	\$4,054	\$47,919	85.4	7,879
ECM 10	Install High Efficiency Hot Water Boilers	0	0.0	67.3	\$561	\$51,973	\$4,054	\$47,919	85.4	7,879
HVAC Sy	stem Improvements	0	0.0	98.3	\$823	\$1,223	\$358	\$865	1.1	11,505
ECM 11	Install Pipe Insulation	0	0.0	98.3	\$823	\$1,223	\$358	\$865	1.1	11,505
Domest	ic Water Heating Upgrade	0	0.0	10.0	\$84	\$151	\$84	\$67	0.8	1,167
ECM 12	Install Low-Flow DHW Devices	0	0.0	10.0	\$84	\$151	\$84	\$67	0.8	1,167
Food Se	rvice & Refrigeration Measures	3,224	0.4	0.0	\$461	\$460	\$100	\$360	0.8	3,246
ECM 13	Vending Machine Control	3,224	0.4	0.0	\$461	\$460	\$100	\$360	0.8	3,246
	TOTALS	259,120	145.4	252.4	\$39,197	\$1,002,430	\$91,696	\$910,735	23.2	290,485

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

## 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 (Ibs)
Lighting	Upgrades	9,362	0.4	-0.2	\$1,312	\$4,661	\$678	\$3,983	3.0	9,403
ECM 1	Install LED Fixtures	8,351	0.0	0.0	\$1,167	\$3,652	\$550	\$3,102	2.7	8,410
ECM 2	Retrofit Fixtures with LED Lamps	1,011	0.4	-0.2	\$145	\$1,009	\$128	\$881	6.1	993
Lighting	Control Measures	50,831	10.4	-10.6	\$7,188	\$47,798	\$15,285	\$32,513	4.5	49,942
ECM 3	Install Occupancy Sensor Lighting Controls	38,238	8.3	-8.0	\$5,403	\$31,598	\$3,735	\$27,863	5.2	37,570
ECM 4	Install High/Low Lighting Controls	12,593	2.1	-2.6	\$1,785	\$16,200	\$11,550	\$4,650	2.6	12,373
Variable	Frequency Drive (VFD) Measures	149,143	61.2	41.7	\$21,832	\$203,665	\$22,100	\$181,565	8.3	155,067
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	10,537	4.4	0.0	\$1,571	\$7,041	\$1,200	\$5,841	3.7	10,611
ECM 6	Install VFDs on Constant Volume (CV) Fans	134,649	56.8	0.0	\$19,352	\$190,919	\$20,775	\$170,144	8.8	135,590
ECM 7	Install VFDs on Kitchen Hood Fan Motors	3,957	0.0	41.7	\$909	\$5,706	\$125	\$5,581	6.1	8,865
HVAC Sy	stem Improvements	0	0.0	98.3	\$823	\$1,223	\$358	\$865	1.1	11,505
ECM 11	Install Pipe Insulation	0	0.0	98.3	\$823	\$1,223	\$358	\$865	1.1	11,505
Domest	ic Water Heating Upgrade	0	0.0	10.0	\$84	\$151	\$84	\$67	0.8	1,167
ECM 12	Install Low-Flow DHW Devices	0	0.0	10.0	\$84	\$151	\$84	\$67	0.8	1,167
Food Se	rvice & Refrigeration Measures	3,224	0.4	0.0	\$461	\$460	\$100	\$360	0.8	3,246
ECM 13	Vending Machine Control	3,224	0.4	0.0	\$461	\$460	\$100	\$360	0.8	3,246
	TOTALS	212,561	72.4	139.1	\$31,699	\$257,958	\$38,605	\$219,353	6.9	230,330

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

# MENDHAM TOWNSHIP ES

#	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 (Ibs)
Lighting	Upgrades		2,630	0.2	0	\$391	\$1,676	\$193	\$1,483	3.8	2,631
ECM 1	Install LED Fixtures	Yes	1,927	0.0	0	\$287	\$941	\$100	\$841	2.9	1,941
ECM 2	Retrofit Fixtures with LED Lamps	Yes	703	0.2	0	\$104	\$734	\$93	\$641	6.2	691
Lighting	Control Measures		26,143	4.6	-5	\$3,851	\$23,539	\$8,390	\$15,149	3.9	25,686
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	19,332	3.5	-4	\$2,848	\$14,314	\$1,810	\$12,504	4.4	18,994
ECM 4	Install High/Low Lighting Controls	Yes	6,811	1.1	-1	\$1,003	\$9,225	\$6,580	\$2,645	2.6	6,692
Variable	Frequency Drive (VFD) Measures		87,430	34.9	15	\$13,154	\$113,337	\$12,350	\$100,987	7.7	89,769
ECM 5	Install VFD on Variable Air Volume (VAV) Fans	Yes	10,537	4.4	0	\$1,571	\$7,041	\$1,200	\$5,841	3.7	10,611
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	75,497	30.5	0	\$11,253	\$103,600	\$11,100	\$92,500	8.2	76,025
ECM 7	Install VFDs on Kitchen Hood Fan Motors	Yes	1,395	0.0	15	\$331	\$2,696	\$50	\$2,646	8.0	3,132
Unitary	HVAC Measures		14,406	24.0	16	\$2,279	\$239,854	\$16,475	\$223,379	98.0	16,362
ECM 8	Install High Efficiency Air Conditioning Units	No	14,406	24.0	16	\$2,279	\$239,854	\$16,475	\$223,379	98.0	16,362
Gas Hea	ting (HVAC/Process) Replacement		0	0.0	67	\$561	\$51,973	\$4,054	\$47,919	85.4	7,879
ECM 9	Install High Efficiency Hot Water Boilers	No	0	0.0	67	\$561	\$51,973	\$4,054	\$47,919	85.4	7,879
HVAC Sy	stem Improvements		0	0.0	63	\$525	\$937	\$280	\$657	1.2	7,377
ECM 10	Install Pipe Insulation	Yes	0	0.0	63	\$525	\$937	\$280	\$657	1.2	7,377
Domest	ic Water Heating Upgrade		0	0.0	4	\$36	\$65	\$36	\$29	0.8	500
ECM 11	Install Low-Flow DHW Devices	Yes	0	0.0	4	\$36	\$65	\$36	\$29	0.8	500
Food Se	rvice & Refrigeration Measures		1,612	0.2	0	\$240	\$230	\$50	\$180	0.7	1,623
ECM 12	Vending Machine Control	Yes	1,612	0.2	0	\$240	\$230	\$50	\$180	0.7	1,623
	TOTALS (COST EFFECTIVE MEASURES)		117,815	39.9	76	\$18,197	\$139,782	\$21,299	\$118,483	6.5	127,585
	TOTALS (ALL MEASURES)		132,220	64.0	160	\$21,037	\$431,610	\$41,828	\$389,782	18.5	151,826

\* - 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.

# MENDHAM TOWNSHIP MS

•	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 (Ibs)
Lighting	Upgrades		6,732	0.2	0	\$921	\$2,985	\$485	\$2,500	2.7	6,772
ECM 1	Install LED Fixtures	Yes	6,424	0.0	0	\$880	\$2,711	\$450	\$2,261	2.6	6,469
ECM 2	Retrofit Fixtures with LED Lamps	Yes	308	0.2	0	\$42	\$275	\$35	\$240	5.8	303
Lighting	Control Measures		24,689	5.8	-5	\$3,337	\$24,259	\$6,895	\$17,364	5.2	24,257
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	18,907	4.8	-4	\$2,556	\$17,284	\$1,925	\$15,359	6.0	18,576
ECM 4	Install High/Low Lighting Controls	Yes	5,782	1.1	-1	\$782	\$6,975	\$4,970	\$2,005	2.6	5,681
Variable	Frequency Drive (VFD) Measures		65,060	27.2	27	\$9,136	\$101,981	\$10,350	\$91,631	10.0	68,668
ECM 5	Install VFDs on Constant Volume (CV) Fans	Yes	59,151	26.3	0	\$8,100	\$87,319	\$9,675	\$77,644	9.6	59,565
ECM 6	Install VFDs on Kitchen Hood Fan Motors	Yes	2,562	0.0	27	\$578	\$3,010	\$75	\$2,935	5.1	5,733
ECM 7	Install VFDs on Water Supply Pump	No	3,346	1.0	0	\$458	\$11,652	\$600	\$11,052	24.1	3,370
Unitary	HVAC Measures		28,807	48.0	30	\$4,199	\$440,992	\$31,962	\$409,031	97.4	32,544
ECM 8	Install High Efficiency Air Conditioning Units	No	28,807	48.0	30	\$4,199	\$440,992	\$31,962	\$409,031	97.4	32,544
HVAC S	stem Improvements		0	0.0	35	\$297	\$287	\$78	\$209	0.7	4,128
ECM 9	Install Pipe Insulation	Yes	0	0.0	35	\$297	\$287	\$78	\$209	0.7	4,128
Domest	ic Water Heating Upgrade		0	0.0	6	\$48	\$86	\$48	\$38	0.8	667
ECM 10	Install Low-Flow DHW Devices	Yes	0	0.0	6	\$48	\$86	\$48	\$38	0.8	667
Food Se	rvice & Refrigeration Measures		1,612	0.2	0	\$221	\$230	\$50	\$180	0.8	1,623
ECM 11	Vending Machine Control	Yes	1,612	0.2	0	\$221	\$230	\$50	\$180	0.8	1,623
	TOTALS (COST EFFECTIVE MEASURES)		94,746	32.5	63	\$13,502	\$118,176	\$17,306	\$100,870	7.5	102,745
	TOTALS (ALL MEASURES)		126,900	81.5	93	\$18,160	\$570,820	\$49,868	\$520,953	28.7	138,659

\* - 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.

## 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

 Eliminate Oversized Domestic Hot Water Heating Systems



## SOLAR ENERGY GENERATION POTENTIAL

	Elementary School	Middle School
Potential:	MEDIUM	High
System Potential: (kW)	311	200
Electric Generation: (kWh per year)	234,010	238,274
Displaced Cost: (per year)	\$34,880	\$32,630

Successor Solar Incentive Program https://www.njcleanenergy.com/renewableenergy/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

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## NJCEP COMMERCIAL & INDUSTRIAL PROGRAMS

https://www.njcleanenergy.com/transition



Programs run by investor-owned utility companies

Name

## PRESCRIPTIVE & CUSTOM ENERGY EFFICIENCY PROGRAM

## Prescriptive and Custom Energy Efficiency Program

For commercial and industrial projects

Costs of these programs may be recovered through customer rates in accordance with New Jersey law. For a complete list of commercial, industrial, residential and low-income energy efficiency programs, please visit energysaveNJ.com.

#### **Prescriptive Projects**

Purchased on or after July 1, 2021\* follow two paths:

If not yet installed or purchased

 $\rightarrow$  submit for pre-approval

If **installed on or after** July 1, 2021 but did not receive pre-approval → you may apply for incentives no later than 180 days of project completion. Completion is defined as equipment being installed and operable.

\*Equipment purchased prior to July 1,2021 may be eligible for incentives at NJCleanEnergy.com

## PRESCRIPTIVE VS. CUSTOM





#### Prescriptive

Install high-efficiency eligible electric equipment across a variety of technologies including:

- Refrigeration Doors, Covers, Freezer Motors
- Electric HVAC
- Controls
- Lighting and Lighting Controls
- Food Service Equipment
- Variable Frequency Drives
- Ground Source Heat Pumps
- More!

#### Custom

Incentives are available for:

- Compressed Air (excluding maintenance or repair for air system leaks)
- Refrigeration
- HVAC
- Building Optimization
- Process Improvements
- Custom Lighting Projects
- More!



## PROCESS



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## OUTREACH ACCOUNT MANAGERS





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