FIRST AMENDMENT TO
PERFORMANCE CONTRACT

THIS FIRST AMENDMENT TO PERFORMANCE CONTRACT ("First Amendment") is made as of the ____ day of _____, 2023 by and between GLEN COVE CITY SCHOOL DISTRICT, having an office at 154 Dosoris Lane, Glen Cove, NY 11542 ("Owner"), and ECOSYSTEM ENERGY SERVICES USA INC., having an address at 462 Seventh Avenue, Floor 22, New York, NY 10018 ("ESCO"). Each of Owner and ESCO may be referred to herein individually as a "Party" and collectively as the "Parties", as the context so requires.

WHEREAS, the Parties entered into a Performance Contract, dated as of October 21, 2021 (the "Agreement"), in connection with the installation of certain energy conservation measures (the "Project"); and

WHEREAS, the Agreement, including the scope of work, attachments, schedules, energy conservation measures and exhibits, were submitted to the New York State Education Department ("NYSED") for review and approval pursuant to the Regulations of the Commissioner of the State of New York; and

WHEREAS, in connection with the Agreement, the New York State Education Department has reviewed the Scope of Services and requested modifications to the same prior to approving the same; and

WHEREAS, the Parties desire to amend the Agreement as set forth more fully in this First Amendment.

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein, the parties agree as follows:

1. **Incorporation of Whereas Clauses.** The above-referenced recitals are incorporated herein by reference.

2. Capitalized terms used in this First Amendment and not otherwise defined herein shall have the meanings ascribed to them in the Agreement.

3. The Agreement and the Exhibits thereto shall be amended in accordance with the following:

   a. The terms of the Agreement are hereby modified as follows:
      i. Paragraph 3 of the Agreement, Agreement Documents, is hereby modified as follows:
         1. Schedule 1 – Scope of Work shall be deleted and replaced with new "Schedule 1 – Scope of Work dated August 31, 2022";
         2. Schedule 2 – Assured Performance Guarantee shall be deleted and replaced with new "Schedule 2 – Assured Performance Guarantee dated August 31, 2022
         3. Schedule 4 – Price and Payment Terms shall be deleted and replaced with new "Schedule 4 – Price and Payment Terms dated August 31, 2022";
         4. Attachment 4 – Comprehensive Energy Audit dated Oct. 20, 2021, with Appendices ("CEA") shall be deleted and replaced with new "Attachment 4 – Comprehensive Energy Audit dated August 31, 2022, with Appendices ("CEA")";
         5. Attachment 5 – Project Financials shall be deleted and replaced with new "Project Financials dated August 31, 2022";
      ii. Paragraph 5 of the Agreement – Engineer of Record

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1. The fee for the Engineer of Record is hereby modified from $376,770.00 to $296,202.00 and shall be modified to reflect the same throughout the Agreement and all Exhibits and Schedules thereto.

b. The document attached to the Agreement as Schedule 1 – Scope of Work is deleted in its entirety and replaced with the Schedule 1 – Scope of Work dated August 31, 2022 attached hereto to this First Amendment as Exhibit 1 and incorporated herein. For purposes of clarity:
   i. The Scope of Work was modified as follows:
      1. Solar PV Installation at the R.M. Finley Middle School and Connolly Elementary School is removed in its entirety;
      2. The Ventilation Upgrade (rooftop unit) at the Landing Elementary School is removed in its entirety;
      3. Lighting is now separated into two separate Measures: Interior Lighting and Exterior Lighting.
   ii. The reference to the Comprehensive Energy Audit dated October 19, 2021 shall be deleted and replaced with "Comprehensive Energy Audit dated August 31, 2022".

c. The document attached to the Agreement as Schedule 2 – Assured Performance Guarantee is deleted in its entirety and replaced with the Schedule 2 – Assured Performance Guarantee dated August 31, 2022, attached hereto to this First Amendment as Exhibit 2 and incorporated herein. For purposes of clarity:
   i. The definition of the term "CEA" in Section A of Schedule 2 Assured Performance Guarantee to the Agreement is hereby added as follows:
   "**CEA** means the Comprehensive Energy Audit, dated as of August 31, 2022.
   ii. Exhibit 1: Total Project Benefits. The following paragraph shall be deleted in its entirety:

   "Subject to the terms and conditions of this Agreement, ESCO guarantees that Customer will achieve a total of $8,996,854 in Measured Project Benefit (Utility Cost Avoidance Measurable Savings), $1,013,652 in Operations and Maintenance Cost Avoidance, and $21,100 in Energy Rebate-Non-Recurring Savings during the term of this Agreement, for Total Guaranteed Project Benefits of $10,031,606 as set forth in the Total Project Benefits Table below."

   -and replaced with the following new paragraph:

   "Subject to the terms and conditions of this Agreement, ESCO guarantees that Customer will achieve a total of $7,480,288 in Measured Project Benefit (Utility Cost Avoidance Measurable Savings), $1,013,652 in Operations and Maintenance Cost Avoidance, and $21,100 in Energy Rebate-Non-Recurring Savings during the term of this Agreement, for Total Guaranteed Project Benefits of $8,515,211 as set forth in the Total Project Benefits Table below."

   iii. Table 2.1.2 – Total Project Benefits is deleted in its entirety and replaced with the following new Table 2.1.2 – Total Project Benefits

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Year	Utility Cost Avoidance* Measurable Savings	Operations & Maintenance Cost Avoidance**	Guaranteed Energy Rebate-Non Recurring Savings	Total Guaranteed Project Benefits
1	$349,345	$56,314	$21,100	$426,760
2	$356,332	$56,314		$412,648
3	$363,459	$56,314		$419,776
4	$370,728	$56,314		$427,046
5	$378,143	$56,314		$434,462
6	$385,706	$56,314		$442,026
7	$393,420	$56,314		$449,741
8	$401,288	$56,314		$457,610
9	$409,314	$56,314		$465,637
10	$417,500	$56,314		$473,824
11	$425,850	$56,314		$482,175
12	$434,367	$56,314		$490,693
13	$443,054	$56,314		$499,381
14	$451,915	$56,314		$508,243
15	$460,953	$56,314		$517,282
16	$470,172	$56,314		$526,502
17	$479,575	$56,314		$535,906
18	$489,167	$56,314		$545,499
Totals	**$7,480,288**	**$1,013,652**	**$21,100**	**$8,515,211**

d. The document attached to the Agreement as Schedule 4 – Price and Payment Terms is deleted in its entirety and replaced with the new Schedule 4 - Price and Payment Terms dated August 31st, 2022, attached to this First Amendment as Exhibit 3. For purposes of clarity:

i. The following "Total Project Costs" section shall be deleted in its entirety,

> ***"Total Project Costs.*** The total cost of the Project, including payment for ESCO and the Engineer of Record is $ 7,932,000 and is broken down as follows.
> *ESCO: $7,555,230*
> *ECG Engineering Group: $376,770"*

and replaced with the following:

> ***"Total Project Costs***. The total cost of the Project, including payment for ESCO and the Engineer of Record is $ 6,220,238 and is broken down as follows:
> *ESCO: $5,924,036*
> *Energia: $296,202"*

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ii. Section 2 of Schedule 4 is hereby modified as follows:
    1. The following sentence, "The total fee to be paid to the Engineer is $376,770 (or revised to reflect 5.0% of the Construction Cost as approved by NYSED)" is deleted in its entirety and replaced with the following new sentence: "The total fee to be paid to the Engineer is $296,202 (or revised to reflect 5.0% of the Construction Cost as approved by NYSED)."

e. The document attached to the Agreement as Attachment 4 – Comprehensive Energy Audit is deleted in its entirety and replaced with the Comprehensive Energy Audit dated August 31, 2022, attached hereto to this First Amendment as Exhibit 4 and incorporated herein. For purposes of clarity:
    i. Energy Conservation Measure ("Measure") 2 Lighting is deleted and replaced with "Measure 2: Interior Lighting" and "Measure 3: Exterior Lighting";
    ii. The Basic Per Measure Breakdown Table is deleted in its entirety and replaced with a new "Basic Per Measure Breakdown" Table as set forth therein;
    iii. The Environmental Benefit Breakdown Table is deleted in its entirety and replaced with a new "Environmental Benefit Breakdown" Table as set forth therein;
    iv. The Capital vs. Non Capital Breakdown Table is deleted in its entirety and replaced with a new "Capital vs. Non Capital Breakdown" Table as set forth therein;
    v. The Per Building Per Measure Capital vs. Non Capital Table is deleted in its entirety and replaced with a new "Per Building Per Measure Capital vs. Non Capital" Table as set forth therein;
    vi. The General Cost Breakdown Table is deleted in its entirety and replaced with a new "General Cost Breakdown" Table as set forth therein;
    vii. The Incidental Cost Breakdown Table is deleted in its entirety and replaced with a new "Incidental Cost Breakdown" Table as set forth therein;
    viii. The Per Building Financial Breakdowns Tables are deleted in their entirety and replaced with new "Per Building Financial Breakdowns" Tables as set forth therein;
    ix. The Scope of Work at R.M. Finley Middle School is modified to delete the Solar PV installation at said location as set forth therein;
    x. The Scope of Work at Connolly Elementary School is modified to delete the Solar PV installation at said location as set forth therein;
    xi. The Scope of Work at the Landing Elementary School is modified to delete the Ventilation Upgrade (rooftop unit) at said location as set forth therein;
    xii. The Scope of Work section for "Thayer, Carraige & Garage" is modified to "Thayer, Carriage & Garage" and the Scope of Work section revised to reflect the itemized Scope of Work at each of the following locations: (1) Admin/Thayer House; (2) Carriage House; and (3) Maintenance Garage as set forth therein;
    xiii. The Financial Projections – Energy Performance Project Cash Flow section is deleted in its entirety and replaced with the new "Financial Projections – Glen Cove City School District Energy Performance Project Cash Flow" as set forth therein;
    xiv. The itemized Per Measure Breakdowns Tables for each Measure are deleted in their entirety and replaced with new "Per Measure Breakdowns" Tables for each Measure as set forth therein.
        1. The following additional modifications are made to the Measure 1 – Solar PV Section:
            a. The following sentence, "This reduces the consumption measured by the utility and cuts the district's electrical usage by 56% of base year usage" is deleted in its entirety and replaced with the new following sentence: "This reduces the consumption measured by the utility and cuts the district's electrical usage by 31% of base year usage."

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b. The following sentence, "Ecosystem will install new rooftop solar PV systems at all schools in the district" is deleted in its entirety and replaced with the following new sentence: "Ecosystem will install new rooftop solar PV systems at four schools in the district."
c. All references to Solar PV work at the R.M. Finley Middle School and Connolly Elementary School are hereby deleted in their entirety;

2. The following additional modifications are made to the Measure 2 – Lighting Upgrade Section:
   a. "Lighting Upgrade" is hereby changed to "Interior Lighting Upgrade";
   b. The following sentence, "Most of the lighting throughout the district is outdated fluorescent technology" is deleted in its entirety and replaced with the following new sentence: "Most of the lighting throughout the district is fluorescent technology";
   c. The following sections are hereby deleted from this Section in their entirety:
      i. All exterior wall packs as well as lamp posts will be replaced with new LED fixtures
      ii. Screw bulbs and plug lamps will receive a lamp replacement
      iii. Occupancy sensors will be added to spaces that currently do not have one, where required by code
      iv. Non LED exit signs will be replaced by LED exit signs
   d. The following new "Operation and Maintenance" Section is added:
      i. Operation and Maintenance. All of the LED fixtures being installed have a much longer rated lifespan when compared to fluorescent lighting. Each fixture is also a self-contained unit, so swapping out a fixture is much easier than swapping out bulbs and ballasts. This means that the fixtures won't have to be maintained as often, and when they do, it's a quick fix. The number of fixtures across the district will also be reduced by 17.5%, meaning there will be much fewer fixtures to maintain.

Equipment Installed	Rated Lifespan
LED Panel	50,000 hours
LED Ballast Bypass Tube	50,000 hours
LED Strip	100,000 hours
LED Recessed High Bay	100,000 hours
LED High Bay	218,000 hours
LED A19 Bulb	11,000 hours

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3. A new "Measure 3-Exterior Lighting Upgrade" Section is hereby added to the DEA and the subsequent Sections renumbered as measures 4-10 accordingly as set forth therein. The scope of work at this section includes the following:
    a. All exterior wall packs as well as lamp posts will be replaced with new LED fixtures. Screw bulbs and plug lamps will receive a lamp replacement.
4. The following additional modifications are made to Measure 6 – Ventilation Upgrades Section:
    a. The scope of work at the Landing Elementary School and all references there are hereby deleted in their entirety.

xv. The Capital and Non-Capital Construction Costs Per Building By Trade Table is deleted in its entirety and replaced with a new "Capital and Non-Capital Costs Per Building By Trade" Table as set forth therein; and,

xvi. The Energy Performance Project Schedule is deleted in its entirety and replaced with a new "Energy Performance Project Schedule" as set forth therein.

xvii. The M&V Plan appended to the Comprehensive Energy Audit at Appendix 4 is hereby deleted in its entirety and replaced with the REVISED M&V Plan attached hereto as Exhibit 5 and incorporated herein.

xviii. The M&V Calculations appended to the Comprehensive Energy Audit at Appendix 5 is hereby deleted in its entirety and replaced with the REVISED M&V Calculations attached hereto as Exhibit 6 and incorporated herein.

4. The document attached to the Agreement as Attachment 5 -Project Financials is deleted in its entirety and replaced with the Project Financials (Cash Flow Statement) dated January 11, 2023, attached to this First Amendment as Exhibit 7 and incorporated herein.

5. Except as expressly provided in this First Amendment, the remaining terms of the Agreement shall remain in full force and effect and are hereby ratified and confirmed by the Parties. Nothing contained herein shall be deemed a waiver of any of the terms, provisions or conditions of the Agreement.

6. Pursuant to New York State Energy Law section 109, et. seq. and 8 N.Y.C.R.R. 155.20, the Agreement and this Amendment shall be executory only to the extent of the monies appropriated and available for the purposes of the Agreement, as amended, and no liability on account therefor shall be incurred beyond the amount of such monies. It is understood that neither the Agreement, as amended, nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate or make available monies for the purpose of the Agreement, as amended.

7. In executing this Amendment, the parties acknowledge that they have the authority to enter into this Amendment, and that all necessary action has been taken to cause this Amendment to become legal, valid and binding.

8. This First Amendment may be executed and/or delivered in counterparts, including by facsimile or email transmission, all of which will be considered one and the same instrument and will become effective when one or more counterparts have been signed by each of the Parties and delivered to the other Parties.

[*End of Document – Signature Page Follows*]

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IN WITNESS WHEREOF, Owner and ESCO have executed this First Amendment as of the date first written above.

OWNER:
GLEN COVE CITY SCHOOL DISTRICRT

By: _____

Name: _____

Title: _____

ESCO:
ECOSYSTEM ENERGY SERVICES USA, INC.

By: _____

Name: GABRIEL TEYSSEDOU

Title: SR. DIRECTOR & REGIONAL MANAGER

01-11-2023

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EXHIBIT 1

Schedule 1
Scope of Work dated August 31, 2022

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REVISED SCOPE OF WORK

1. **SUMMARY OF WORK:** The following summarizes the Work to be provided by ESCO under this Agreement, as further defined below:

		GLEN COVE HIGH SCHOOL	R.M. FINLEY MIDDLE SCHOOL	CONNOLLY ELEMENTARY SCHOOL	DEASY ELEMENTARY SCHOOL	GRIBBIN ELEMENTARY SCHOOL	LANDING ELEMENTARY SCHOOL	CARRIAGE & THAYER HOUSE	GARAGE/SHOP
1	SOLAR PV	●			●	●	●		
2	INTERIOR LIGHTING UPGRADES	●	●	●	●	●	●	●	●
3	EXTERIOR LIGHTING UPGRADES	●	●	●	●	●			●
4	BOILER UPGRADES			●					
5	VFDS AND MOTOR REPLACEMENT	●		●		●			
6	VENTILATION UPGRADE	●							
7	BMS UPGRADE	●	●	●	●	●	●	●	
8	COMPUTER ENERGY MANAGER	●	●	●	●	●	●	●	
9	PLUG LOAD MANAGERS	●	●	●	●	●	●	●	●
10	ENVELOPE IMPROVEMENTS	●		●		●	●		
11	INSULATION IMPROVEMENTS	●		●		●	●		

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GENERAL

All work to be undertaken and performed by ESCO shall be performed in strict accordance with all applicable laws, rules, regulations and ordinances in effect at the time of signing of this Agreement. In addition, all work undertaken by ESCO must be in strict accordance with the plans and specifications developed by the district Engineer and approved by the NYSED.

ECM SCOPE NARRATIVE BY MEASURE

PLEASE REFER TO ATTACHED COMPREHENSIVE ENERGY AUDIT DATED AUGUST 31, 2022.

CONSTRUCTION MANAGEMENT

All work set forth in the Agreement shall be coordinated with the Customer, approved by the Engineer as set forth in the Agreement and attachments thereto and be carried out in accordance with this Agreement and all attachments and appendices hereto.

1. ESCO will prepare and maintain an overall Project Management Plan and Construction Schedule which shall be provided to the Customer and Engineer for approval. Updates will be provided by ESCO to the Customer and the Engineer on an on-going basis.

2. ESCO shall maintain a staff to administer the contract terms and conditions with all project subcontractors.

3. ESCO will provide coordination and total supervision of the work of separate ECMs ensuring enforcement of all contract provisions, compliance with energy initiatives, and timely completion of the project. All such work shall be coordinated with the Customer and the Engineer and shall further be scheduled and coordinated with any capital improvements undertaken at the District facilities. ESCO shall be responsible for scheduling and coordinating all work identified within Schedule 1 with any capital work being undertaken at the Customer's Facilities.

4. ESCO shall establish and maintain coordination procedures, including project meetings and documentation process. ESCO shall attend all project meetings as required by the Customer and/or the Engineer.

5. ESCO shall submit a site accessibility plan to the Customer, Engineer and contractors/subcontractors to ensure continuous operation of school services and activities. All schedules and site accessibility plans require approval by the Customer and Engineer.

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6. ESCO shall perform all inspection work necessary to assure the conformity to the plans and specifications until final completion and acceptance of the project by the Customer.

7. ESCO shall coordinate post-completion activities including the assembly of guarantees, manuals, as-built drawings of all trade and subcontractors, and the Customer's final acceptance with the Engineer. ESCO shall Schedule 1 – Scope of Work coordinate training of the Customer's personnel by installers and vendors for the operations of the project with the Customer's Representative and Engineer.

8. ESCO shall coordinate all aspects of the project with the District-approved Engineering firm, ECG Engineers, P.C. ECG will prepare and submit all necessary design work to the New York State Education Department for approval in accordance with the terms of the Agreement between the District and Engineer attached hereto at Attachment 6 and Appendix 1, Scope of Engineering Services.

9. ESCO and its subcontractors will be required to wear photo identification at all times while on School District property.

10. ESCO and its subcontractors shall attend Customer Committee meetings at the request of the Customer, if any, during the construction of the project and meetings related to the District's capital improvement projects being undertaken by the Customer. ESCO shall be fully aware of any and all capital improvement projects undertaken by the District which may have an impact on the energy performance project.

11. In addition to the terms set for the herein, the General Conditions delineate the terms and conditions of the construction services to be provided by ESCO. ESCO represents that it is aware of and bound by the terms and conditions of the services as provided said Attachments. Construction phase services will be performed according to the terms and conditions of Appendix 1, Scope of Engineering Services and the General Conditions.

12. Work will commence upon SED approval and the Customer's receipt of the necessary financing for the project. Hours of work shall be as set forth in paragraph six (6) of this Agreement. All costs incurred by the Customer, including overtime costs for District personnel, to make the facilities available during evening and weekends shall be borne solely by ESCO

EXHIBIT 2

Schedule 2
Assured Performance Guarantee
dated August 31, 2022

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ASSURED PERFORMANCE GUARANTEE

A. Certain Definitions

For purposes of this Agreement, the following terms have the meanings set forth below:

Annual Project Benefits are the portion of the projected Total Project Benefits to be achieved in any one year of the Guarantee Term.

Annual Project Benefits Realized are the Project Benefits actually realized for any one year of the Guarantee Term.

Annual Project Benefits Shortfall is the amount by which the Annual Project Benefits Realized is less than the Annual Project Benefits in any one year of the Guarantee Term.

Annual Project Benefits Surplus is the amount by which the Annual Project Benefits Realized exceed the Annual Project Benefits in any one year of the Guarantee Term.

Baseline is the mutually agreed upon data and/or usage amounts that reflect conditions prior to the installation of the Improvement Measures as set forth in exhibit 6 below.

CEA means the Comprehensive Energy Audit, dated as of August 31, 2022.

ECM means the energy conservation measure(s) explained in the Detailed Study dated August 2021and consisting of the equipment, materials, machinery, procedures and systems to be designed, constructed, installed and implemented in each Installation and, when there is more than one Measure, any reference to "Measures" means collectively all these measures.

Guaranteed Energy Cost Savings means, in dollars, the energy cost savings guaranteed by the ESCO, for each Installation, and resulting directly from the ECM, as calculated by the ESCO according to the method established, in order to respect the reimbursement over the Guarantee Payback Period.

Guaranteed Payback Period is up to eighteen (18) years and means the period of time needed for all of the costs of the project to be completely amortized by the Guaranteed Energy Cost Savings all as detailed in the Detailed Study.

Guarantee Term will commence on the first day of the month next following the Substantial Completion date and will continue through the duration of the three years (3) of M&V Services, subject to earlier termination as provided in this Agreement, or extension of the M&V Services period.

Installation(s) means the building(s) and the structure(s) in or on which the ECM must be designed, constructed, installed and implemented, as described in the Detailed Study, and, when there is more than one Installation, any reference to "Installations" means collectively all these installations.

Installation Period is the period beginning on ESCO's receipt of Customer's Notice to Proceed and ending on the commencement of the Guarantee Term.

Interim Savings means all savings monitored between the date of the commencement of the implementation of the ECM and the Starting Date, for each Installation, and resulting directly from the ECM.

Measured Project Benefits are the utility savings and cost avoidance calculated in accordance with the methodologies set forth in Section III below.

Project Benefits are the Measured Project Benefits plus the Operational and Maintenance Project Benefits to be achieved for a particular period during the term of this Agreement.

Schedule 2 – Assured Performance Guarantee

Starting Date means the date on which the Guaranteed Energy Cost Savings begin to be recorded.

Total Project Benefits are the projected Project Benefits to be achieved during the entire term of this Agreement.

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Guarantee Details

The following Exhibits are attached and made part of this Schedule 2, Section B:

Table 2.1.1: Exhibits Summary

Exhibit 1	Total Project Benefits
Exhibit 2	Measurement and Verification Methodologies
	Measurement and Verification Plan Table of Contents 1. Facility Description 2. Measure Objectives 3. Measuring Options and Boundaries 4. Baseline: Period, Energy and Conditions 5. M&V Period 6. Basis for Adjustments 7. Baseline Adjustment Methodology 8. Energy Price Adjustments 9. Meter Features 10. Distribution of M&V Responsibilities 11. Report Responsibilities 12. Budget 13. Report Format 14. Measurement and verification services

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EXHIBIT 1: TOTAL PROJECT BENEFITS

Subject to the terms and conditions of this Agreement, ESCO guarantees that Customer will achieve a total of $7,480,288 in Measured Project Benefit (Utility Cost Avoidance Measurable Savings), $1,013,652 in Operations and Maintenance Cost Avoidance, and $21,100 in Energy Rebate-Non-Recurring Savings during the term of this Agreement, for Total Guaranteed Project Benefits of $8,515,211 as set forth in the Total Project Benefits Table below.

Table 2.1.2: Total Project Benefits

Year	Utility Cost Avoidance* Measurable Savings	Operations & Maintenance Cost Avoidance**	Guaranteed Energy Rebate-Non Recurring Savings	Total Guaranteed Project Benefits
1	$349,345	$56,314	$21,100	$426,760
2	$356,332	$56,314		$412,648
3	$363,459	$56,314		$419,776
4	$370,728	$56,314		$427,046
5	$378,143	$56,314		$434,462
6	$385,706	$56,314		$442,026
7	$393,420	$56,314		$449,741
8	$401,288	$56,314		$457,610
9	$409,314	$56,314		$465,637
10	$417,500	$56,314		$473,824
11	$425,850	$56,314		$482,175
12	$434,367	$56,314		$490,693
13	$443,054	$56,314		$499,381
14	$451,915	$56,314		$508,243
15	$460,953	$56,314		$517,282
16	$470,172	$56,314		$526,502
17	$479,575	$56,314		$535,906
18	$489,167	$56,314		$545,499
Totals	$7,480,288	$1,013,652	$21,100	$8,515,211

*Utility Cost Avoidance is a Measured Project Benefit. Utility Cost Avoidance figures in the table above are based on anticipated 2.0% increase in unit energy costs as set forth in Exhibit 6.

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Annual Measurement and Verification (M&V) Services

ESCO shall provide M&V Services for a period of three (3) years starting on the first day of the month next following the Substantial Completion date, unless otherwise terminated or extended by the Customer. Within sixty (60) days of the commencement of the Guarantee Term, ESCO will calculate the Measured Project Benefits achieved during the Installation Period and provide a written Report to the Customer for its review and approval in each Guarantee Year. Any Project Benefits achieved during the Installation Period shall inure to the benefit of the Customer. Within sixty (60) days of each anniversary of the commencement of the Guarantee Term, ESCO will calculate the Measured Project Benefits achieved for the applicable year plus any Non-Measured Project Benefits applicable to such period and advise Customer of same in writing.

As set forth in the Certification provided by ESCO to the NY State Education Department, ESCO guarantees recovery of costs of the Agreement from energy savings realized by the Customer during a period of 18 years.

Customer acknowledges and agrees that if, for any reason during the agreed-upon period of M&V Services for years 1-3, and any renewal period authorized by the Customer in years 4-18, it (i) cancels or terminates receipt of M&V Services, or (ii) cancels or terminates this Agreement, other than due to ESCO's material breach thereof, it shall be assumed (in accordance with Option C of the North American Energy Measurement and Verification Protocol (NEMVP), and based upon the equipment continuing to operate in accordance with specified criteria)throughout the term of the Agreement, that the Annual Project Benefits will be met during each year of the Guarantee Payback Period.

Customer further acknowledges and agrees that if, for any reason, it (i) fails to pay for M&V Services in accordance with the terms of this Agreement and Schedule 4 – Price and Payment Terms after receipt of a notice to cure within thirty (30) days, (ii) fails to fulfill any of Customer's responsibilities necessary to enable ESCO to complete the Work and provide the M&V Services, including but not limited to Customer's failure to operate and maintain the equipment and/or systems as provided by ESCO or (iii) otherwise materially breaches this Agreement, ESCO shall issue a written notice to the Customer stating the nature of the alleged breach and shall provide Customer with a thirty (30) day period to cure such breach. If the Customer fails to cure such breach within such thirty (30) day period, Customer acknowledges and agrees that the Assured Performance Guarantee shall automatically terminate, unless otherwise agreed to in writing by the parties.

Project Benefits Shortfalls or Surpluses.

(1) During the period in which ESCO is providing M&V Services, the following shall apply:

(a) *Project Benefits Shortfalls*. If an Annual Project Benefits Shortfall occurs for any one year of the Guarantee Term, ESCO shall (a) pay to Customer the amount of such shortfall, or (b) subject to Customer's written agreement, provide to Customer additional products or services, in the value of such shortfall, at no additional cost to Customer in accordance with all applicable laws, rules, codes and regulations. All annual payments to Customer for any annual Shortfall shall be payable to Customer in the form of a certified check.

(b) *Project Benefits Surpluses*. If an Annual Project Benefits Surplus occurs for any one year of the Guarantee Term, the surplus, in its entirety, shall inure to the benefit of the Customer, and shall not be applied to any shortfall during any year of the Guarantee Term. In addition, any savings achieved during the installation phase shall inure solely to the benefit of the Customer.

EXHIBIT 2: MEASUREMENT AND VERIFICATION METHODOLOGIES

The following is a brief overview of the measurement and verification methodologies applicable to the Improvement Measures set forth below. ESCO shall apply these methodologies, as more fully detailed in the guidelines and standards of the North American Energy Measurement and Verification Protocol (NEMVP), in connection with the provision of M&V Services hereunder.

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ecosystem

Energy Savings Experts

MEASUREMENT AND VERIFICATION PLAN

Glen Cove Central School District
Project No. 20SEE0003
Revision 3

Date: August 31, 2022

By: Hayden von Hoffmann

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EXHIBIT 3

Schedule 4
Price and Payments Terms
dated August 31, 2022

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PRICE AND PAYMENT TERMS

Customer shall make payments to ESCO pursuant to this Schedule 4.

Total Project Costs. The total cost of the Project, including payment for ESCO and the Engineer of Record is $ 6,220,238 and is broken down as follows.

ESCO: $5,924,036
ECG Engineering Group: $296,202

1. **Payments shall be made to ESCO as follows**: Within thirty (30) days after execution of this Agreement, ESCO shall submit for the Engineer of Record's review and approval a Schedule of Values for all of the Work to be performed under the Agreement. Such Schedule will (i) subdivide the Work into its respective parts by building; (ii) include values for all items comprising the Work; and (iii) serve as the basis for monthly progress payments made to ESCO throughout the Work. The Work will commence, and this Agreement shall be deemed executory, upon approval of SED, the securing of the necessary financing by the Customer for the Work and the Customer's receipt of all necessary documents, including the approved final cash-flow statement. The Customer shall withhold five percent (5%) of the total Work completed and stored. Upon reaching Substantial Completion, as defined in the Agreement, retainage shall be reduced to two percent (2%), which remaining retention shall be released at Final Completion.

   Customer shall make payment to ESCO against monthly invoices for work completed and approved in accordance with the agreed upon Schedule of Values. Payments will be made on a progress payment basis for work completed and accepted by the Customer and the Engineer using the AIA format. ESCO must attach certified payrolls to each application for payment, together with supporting documents as required by the Customer and Engineer, including but not limited to any lien waivers for the work completed. All communications related to payment for work performed shall be directed to the Customer. Under no circumstance, shall ESCO contact the Customer's financial representatives or selected financial institutions.

   Payments may be withheld on account of any material breach of this Agreement by ESCO, and claims by third parties (including ESCO subcontractors and material suppliers), but only to the extent that written notice has been provided to ESCO and ESCO has failed, within ten (10) days of the date of receipt of such notice, to provide adequate security to protect Customer from any loss, cost or expense related to such claims, as determined by the Customer.

2. **Payments for Engineering Services**.

   ENGINEER OF RECORD. The Customer has identified and designates ECG Engineering, P.C. "ECG" as the certified Engineer of Record (the "Engineer") to provide engineering in accordance with Attachment 6. ESCO, Customer and Engineer agree that ESCO shall be responsible for making payments for Engineering services directly to the Engineer as set forth herein. The total fee to be paid to the Engineer is $376,770 (or revised to reflect 5.0% of the Construction Cost as approved by NYSED). ESCO will make payments to the Engineer in accordance with the following schedule and terms:

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1) 30% upon Customer signing this contract with ESCO;
2) 30% upon submittal of plans and specifications to NYSED;
3) 30% upon approval of plans and specifications by NYSED; and
4) 10 % upon substantial completion
5) At the completion of post-construction services, the Owner shall withhold the amount of $5,000 from the Engineer's final payment identified above. In accordance therewith, the Customer will direct the ESCO to deduct $5,000 from the last invoice submitted by the Engineer. The Customer will further require the ESCO to issue payment for the remaining $5,000 directly to the Customer. This amount shall be paid to the Engineer by the Customer upon completion of its evaluation of the actual energy savings realized at the conclusion of the first and second year of the ESCO guarantee period. The Engineer will receive two (2) annual payments of $2,500 in connection with these services. Such payments shall be issued by the Customer within thirty (30) days of the Customer's receipt of ECG's annual M&V report.

In the event that the selected ESCO fails to make payment for engineering services within 45 days of receipt of an invoice from ECG, the ESCO, the ESCO shall be charged a late payment penalty of 1% per month.

3. **M&V Services**. ESCO shall provide M&V Services for the project from the construction period through Year 3 at no additional cost to the Customer. The Customer may request additional years of M&V Services beyond Year 3 annually for years 4-18 at the annual rate set forth below. This schedule of costs is not included in the Total Project Cost of the energy performance contract set forth above.

Contract Year	M&V cost for proposed Year
4	$16,000
5	$16,320
6	$16,646
7	$16,979
8	$17,319
9	$17,665
10	$18,019
11	$18,379
12	$18,747
13	$19,121
14	$19,504
15	$19,894
16	$20,292
17	$20,698
18	$21,112

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EXHIBIT 4

Attachment 4
Comprehensive Energy Audit dated
August 31, 2022

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Glen Cove City School District

ECOSYSTEM PRESENTS

Comprehensive Energy Audit

August 31, 2021

ecosystem

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Executive Summary

Ecosystem Energy Services (Ecosystem) is proud to present this Comprehensive Energy Audit report to the Glen Cove City School District (the District), ECG Engineering P.C., and the New York State Education Department (SED).

Ecosystem developed the measures presented in this report specifically to address the needs of the District, while reducing energy costs and consumption. This project uses real energy and maintenance savings to finance pertinent improvements for the District. Energy savings primarily result from lighting conversions, the installation of photovoltaic solar panels, and an overhaul on the District's Building Management System (BMS). These energy saving measures will also contribute to the comfort of the District's occupied spaces by providing better quality light at appropriate light levels and improving the methods of heating and ventilation used. Ecosystem targeted the opportunities for integration and efficiency with major energy savings and comfort improvement measures. We will install solar photovoltaic panels across the district school buildings. These solar panels greatly reduce the districts electrical energy consumption costs and its environmental footprint. Ownership of the photovoltaic solar systems may require routine maintenance, including removal and reinstallation of the system if roof maintenance or replacement is required. However, the District understands that the financial, environmental, and energy efficiency benefits far exceed any associated cost.

All work to be conducted at the District complies with codes set forth in the SED Manual of Planning Standards, New York Energy Conservation Code, the New York State Mechanical Code, and local building codes, as amended. The following tables present the project costs, savings, and payback of both capital and non-capital measures, the measures being implemented at each building in the District,and detailed energy savings per measure.

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Measure Matrix

		GLEN COVE HIGH SCHOOL	R.M. FINLEY MIDDLE SCHOOL	CONNOLLY ELEMENTARY SCHOOL	DEASY ELEMENTARY SCHOOL	GRIBBIN ELEMENTARY SCHOOL	LANDING ELEMENTARY SCHOOL	CARRIAGE & THAYER HOUSE	GARAGE/SHOP
1	SOLAR PV	●			●	●	●		
2	INTERIOR LIGHTING UPGRADES	●	●	●	●	●	●	●	●
3	EXTERIOR LIGHTING UPGRADES	●	●	●	●	●			●
4	BOILER UPGRADES			●					
5	VFDS AND MOTOR REPLACEMENT	●		●		●			
6	VENTILATION UPGRADE	●							
7	BMS UPGRADE	●	●	●	●	●	●	●	
8	COMPUTER ENERGY MANAGER	●	●	●	●	●	●	●	
9	PLUG LOAD MANAGERS	●	●	●	●	●	●	●	●
10	ENVELOPE IMPROVEMENTS	●		●		●	●		
11	INSULATION IMPROVEMENTS	●		●		●	●		

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Basic Per Measure Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Contsruction Cost	EPC Project Management	Overhead and Profit	Architect Cost	Total Measure Cost	Simple Payback
1 Solar PV	$129,043.93	0.0	824,837.91	0.0	$0.00	$129,043.93	$0.00	$1,386,301.30	$126,027.39	$202,329.69	$85,732.92	$1,800,391.30	14.0
2 Interior Lighting Upgrades	$84,035.73	1520	410,577.01	0.0	$30,324.00	$114,359.73	$21,100.00	$1,562,075.10	$142,006.83	$227,983.75	$96,603.28	$2,028,668.96	17.6
3 Exterior Lighting Upgrades	$16,252.77	0.0	114,977.22	0.0	$722.50	$16,975.27	$0.00	$78,888.41	$7,171.67	$11,513.71	$4,878.69	$102,452.48	6.0
4 Boiler/Burner Upgrade/Replacement	$11,682.00	0.0	0.00	1,436.9	$7,877.50	$19,559.50	$0.00	$461,075.16	$41,915.92	$67,293.59	$28,514.23	$598,798.91	30.6
5 VFDs and Motor Replacement	$18,955.83	0.0	128,037.46	0.0	$0.00	$18,955.83	$0.00	$128,337.30	$11,667.03	$18,730.74	$7,936.75	$166,671.81	8.8
6 Air Handling Unit Upgrade/Replacement	$106.52	0.0	-28,167.27	469.2	$0.00	$106.52	$0.00	$408,423.35	$37,129.40	$59,609.10	$25,258.09	$530,419.94	4979.3
7 BMS & Controls Upgrade	$36,793.87	0.0	0.00	4,328.9	$12,390.10	$49,183.97	$0.00	$441,144.82	$40,104.07	$64,384.77	$27,281.68	$572,915.35	11.6
8 Computer Energy Manager	$18,626.70	0.0	138,430.16	0.0	$5,000.00	$23,626.70	$0.00	$22,813.40	$2,073.95	$3,329.60	$1,410.85	$29,627.80	1.3
9 Plug Load Managers	$15,117.40	0.0	106,361.94	0.0	$0.00	$15,117.40	$0.00	$62,593.18	$5,690.29	$9,135.43	$3,870.95	$81,289.85	5.4
10 Envelope Improvements	$14,201.63	0.0	0.00	1,518.7	$0.00	$14,201.63	$0.00	$180,832.19	$16,439.29	$26,392.33	$11,183.19	$234,847.00	16.5
11 Insulation Improvement	$4,528.59	0.0	0.00	436.2	$0.00	$4,528.59	$0.00	$57,098.95	$5,190.81	$8,333.55	$3,531.17	$74,154.48	16.4
Total	$349,345	1,520	1,695,054	8,190	$56,314	$405,659	$21,100	$4,789,583	$435,417	$699,036	$296,202	$6,220,238	15.28

Total Project Cost	$6,220,238
Total Incentives	$21,100
Yearly Savings	$405,659
Total Savings and Incentives	$7,322,963
Simple Payback	15.28

GHG	tonnes CO_2	GHG Equivalent	
Before	2710.4	Cars	Homes
After	1345.9	294	156
Savings	1364.5		
Savings (%)	50%		

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Environmental Benefit Breakdown

School	Gas Use Before (MMBTU)	Electric Use Before (kWh)	Gas Emissions Before (mTon CO2e)	Electric Emissions Before (mTon CO2e)	Gas Use After (MMBTU)	Electric Use After (kWh)	Gas Emissions After (mTon CO2e)	Electric Emissions After (mTon CO2e)	Total Change in Emissions (mTon CO2e)
Glen Cove HS	12,651.1	963,000	671.9	528.1	10,024.6	149,630.2	532.4	82.1	585.5
R.M. Finley MS	2,086.9	706,200	110.8	387.3	2,086.9	461,603.5	110.8	253.1	134.1
Connolly ES	3,246.2	283,920	172.4	155.7	967.8	177,799.3	51.4	97.5	179.2
Deasy ES	464.0	140,680	24.6	77.1	464.0	0.1	24.6	0.0	77.1
Gribbin ES	2,769.7	161,640	147.1	88.6	1,364.6	624.8	72.5	0.3	162.9
Landing ES	2,879.6	205,440	152.9	112.7	999.9	482.9	53.1	0.3	212.2
Admin/Thayer House	352.0	39,504	18.7	21.7	352.0	29,475.8	18.7	16.2	5.5
Carriage House	124.1	3,522	6.6	1.9	124.1	537.9	6.6	0.3	1.6
Bus Garage / Shop	355.6	24,280	18.9	13.3	355.6	12,977.0	18.9	7.1	6.2
Total	24,929	2,528,186	1,324	1,386	16,739	833,132	889	457	1,365

Capital vs Non-Capital Breakdown

	Measures (Capital)	Energy Savings	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback (Years)
1	Solar PV	$129,043.93	$0.00	$129,043.93	$0.00	$1,800,391.30	14.0
2	Interior Lighting Upgrades	$80,992.06	$29,182.65	$110,174.71	$21,100.00	$1,999,474.39	18.0
3	Exterior Lighting Upgrades	$15,681.63	$702.50	$16,384.13	$0.00	$100,939.38	6.2
4	Boiler/Burner Upgrade/Replacement	$11,682.00	$7,877.50	$19,559.50	$0.00	$598,798.91	30.6
5	VFDs and Motor Replacement	$18,955.83	$0.00	$18,955.83	$0.00	$166,671.81	8.8
6	Air Handling Unit Upgrade/Replacement	$106.52	$0.00	$106.52	$0.00	$530,419.94	4979.3
7	BMS & Controls Upgrade	$34,954.18	$12,390.10	$47,344.28	$0.00	$429,686.51	9.1
10	Envelope Improvements	$14,201.63	$0.00	$14,201.63	$0.00	$234,847.00	16.5
11	Insulation Improvement	$4,528.59	$0.00	$4,528.59	$0.00	$74,154.48	16.4
	Total (Capital)	**$310,146.37**	**$50,152.75**	**$360,299.12**	**$21,100.00**	**$5,935,383.73**	**16.41**

	Measures (Non-Capital)	Energy Savings	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback (Years)
2	Interior Lighting Upgrades	$3,043.67	$1,141.35	$4,185.02	$0.00	$29,194.57	7.0
3	Exterior Lighting Upgrades	$571.14	$20.00	$591.14	$0.00	$1,513.10	2.6
7	BMS & Controls Upgrade	$1,839.69	$0.00	$1,839.69	$0.00	$143,228.84	77.9
8	Computer Energy Manager	$18,626.70	$5,000.00	$23,626.70	$0.00	$29,627.80	1.3
9	Plug Load Managers	$15,117.40	$0.00	$15,117.40	$0.00	$81,289.85	5.4
	Total (Non-Capital)	**$39,198.60**	**$6,161.35**	**$45,359.95**	**$0.00**	**$284,854.16**	**6.28**
	Total	**$349,345**	**$56,314**	**$405,659**	**$21,100**	**$6,220,238**	**15.28**

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Per Building Per Measure Capital vs Noncapital

	Measure 1 Solar PV		Measure 2 Interior Lighting Upgrades		Measure 3 Exterior Lighting Upgrades		Measure 4 Boiler Upgrades		Measure 5 VFDs & Motor Upgrades		Measure 6 Ventilation Upgrades	
School	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**
Glen Cove HS	$ 1,094,542.60	$ -	$ 1,057,163.89	$ -	$ 43,871.71	$ -	$ -	$ -	$ 102,877.52	$ -	$ 530,419.94	$ -
R. M. Finley MS	$ -	$ -	$ 459,056.82	$ -	$ 22,044.53	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Connolly ES	$ -	$ -	$ 115,237.40	$ -	$ 7,458.51	$ -	$ 598,798.91	$ -	$ 39,900.29	$ -	$ -	$ -
Deasy ES	$ 230,216.93	$ -	$ 114,638.94	$ -	$ 1,513.10	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gribbin ES	$ 354,550.77	$ -	$ 137,710.67	$ -	$ 13,537.89	$ -	$ -	$ -	$ 23,894.01	$ -	$ -	$ -
Landing ES	$ 121,081.00	$ -	$ 115,666.67	$ -	$ 12,513.63	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Thayer	$ -	$ -	$ -	$12,925.89	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Carriage	$ -	$ -	$ -	$ 4,415.03	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Garage	$ -	$ -	$ -	$11,853.55	$ -	$ 1,513.10	$ -	$ -	$ -	$ -	$ -	$ -
Total	$ 1,800,391.30	$ -	$ 1,999,474.39	$29,194.57	$ 100,939.38	$ 1,513.10	$ 598,798.91	$ -	$ 166,671.81	$ -	$ 530,419.94	$ -

	Measure 7 BMS & Controls Upgrade		Measure 8 Computer Energy Manager		Measure 9 Plug Load Managers		Measure 10 Envelope Improvements		Measure 11 Insulation Improvements		TOTAL		
School	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Capital**	**Non-Capital**	**Total**
Glen Cove HS	$ 86,415.38	$ 28,805.13	$ -	$11,318.84	$ -	$ 19,957.39	$ 55,960.66	$ -	$ 23,671.87	$ -	$ 2,994,923.56	$ 60,081.36	$ 3,055,004.91
R. M. Finley MS	$ 68,089.23	$ 22,696.41	$ -	$ 8,946.06	$ -	$ 18,253.71	$ -	$ -	$ -	$ -	$ 549,190.58	$ 49,896.17	$ 599,086.75
Connolly ES	$ 68,234.10	$ 22,744.70	$ -	$ 2,020.08	$ -	$ 10,465.46	$ 20,359.16	$ -	$ 4,158.76	$ -	$ 854,147.13	$ 35,230.24	$ 889,377.37
Deasy ES	$ 16,225.52	$ 5,408.51	$ -	$ 2,052.14	$ -	$ 10,465.46	$ -	$ -	$ -	$ -	$ 362,594.50	$ 17,926.11	$ 380,520.61
Gribbin ES	$ 147,695.68	$ 49,231.89	$ -	$ 2,084.21	$ -	$ 11,682.37	$ 27,556.34	$ -	$ 12,503.31	$ -	$ 717,448.67	$ 62,998.47	$ 780,447.14
Landing ES	$ 43,026.60	$ 14,342.20	$ -	$ 2,244.53	$ -	$ 8,518.40	$ 130,970.84	$ -	$ 33,820.55	$ -	$ 457,079.30	$ 25,105.13	$ 482,184.42
Thayer	$ -	$ -	$ -	$ 641.29	$ -	$ 1,460.30	$ -	$ -	$ -	$ -	$ -	$ 15,027.49	$ 15,027.49
Carriage	$ -	$ -	$ -	$ 320.65	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,735.68	$ 4,735.68
Garage	$ -	$ -	$ -	$ -	$ -	$ 486.77	$ -	$ -	$ -	$ -	$ -	$ 13,853.51	$ 13,853.51
Total	$ 429,686.51	$ 143,228.84	$ -	$29,627.80	$ -	$ 81,289.85	$ 234,847.00	$ -	$ 74,154.48	$ -	$ 5,935,383.73	$284,854.16	$ 6,220,238

BUILDING SUMMARIES

General Cost Breakdown

General Cost Breakdown

Buildings	Glen Cove HS	R.M. Finley MS	Connolly ES	Deasy ES	Gribbin ES	Landing ES	Admin/Thayer House	Carriage House	Bus Garage / Shop	Total
Total Project Cost	$ 3,055,004.91	$ 599,086.75	$ 889,377.37	$ 380,520.61	$ 780,447.14	$ 482,184.42	$ 15,027.49	$ 4,735.68	$ 13,853.51	**$ 6,220,238**
Incentives	$ 21,100.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 21,100**
Capital Construction Cost	$ 2,293,877.72	$ 417,539.22	$ 656,331.52	$ 277,910.24	$ 550,755.54	$ 350,527.04	$ 9,809.71	$ 3,350.65	$ 10,143.84	**$ 4,570,245**
Non-Capital Construcion Cost	$ 58,476.06	$ 43,757.58	$ 28,489.05	$ 15,090.63	$ 50,188.76	$ 20,754.96	$ 1,761.46	$ 295.82	$ 523.37	**$ 219,338**
Total Construction Cost	$ 2,352,353.78	$ 461,296.80	$ 684,820.57	$ 293,000.87	$ 600,944.30	$ 371,282.01	$ 11,571.16	$ 3,646.47	$ 10,667.21	**$ 4,789,583**
EPC Project Management	$ 213,850.34	$ 41,936.07	$ 62,256.42	$ 26,636.44	$ 54,631.30	$ 33,752.91	$ 1,051.92	$ 331.50	$ 969.75	**$ 435,417**
Overhead and Profit	$ 343,324.36	$ 67,325.94	$ 99,949.08	$ 42,763.27	$ 87,707.39	$ 54,188.34	$ 1,688.80	$ 532.20	$ 1,556.87	**$ 699,036**
Architect Fee	$ 145,476.42	$ 28,527.94	$ 42,351.30	$ 18,120.03	$ 37,164.15	$ 22,961.16	$ 715.59	$ 225.51	$ 659.69	**$ 296,202**

Incidental Cost Breakdown

Incidental Costs for Work in Each School Building

School	Glen Cove HS	R.M. Finley MS	Connolly ES	Deasy ES	Gribbin ES	Landing ES	Admin/Thayer House	Carriage House	Bus Garage / Shop
Architect's Fee	$ 145,476.42	$ 28,527.94	$ 42,351.30	$ 18,120.03	$ 37,164.15	$ 22,961.16	$ 715.59	$ 225.51	$ 659.69
Project Management Costs	$ 213,850.34	$ 41,936.07	$ 62,256.42	$ 26,636.44	$ 54,631.30	$ 33,752.91	$ 1,051.92	$ 331.50	$ 969.75
Legal Services	$ 10,299.73	$ 2,019.78	$ 2,998.47	$ 1,282.90	$ 2,631.22	$ 1,625.65	$ 50.66	$ 15.97	$ 46.71
Overhead and Profit	$ 315,858.41	$ 61,939.86	$ 91,953.15	$ 39,342.21	$ 80,690.80	$ 49,853.28	$ 1,553.70	$ 489.62	$ 1,432.32
Insurance During Construction	$ 15,449.60	$ 3,029.67	$ 4,497.71	$ 1,924.35	$ 3,946.83	$ 2,438.48	$ 76.00	$ 23.95	$ 70.06
Utilities	$ 1,716.62	$ 336.63	$ 499.75	$ 213.82	$ 438.54	$ 270.94	$ 8.44	$ 2.66	$ 7.78
Total	**$ 702,651**	**$ 137,790**	**$ 204,557**	**$ 87,520**	**$ 179,503**	**$ 110,902**	**$ 3,456**	**$ 1,089**	**$ 3,186**

Per Building Financial Breakdowns

Glen Cove High School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$89,478.05	0	556,611.77	0.0	$0.00	$89,478.05	$0.00	$1,094,542.60	12.2
Interior Lighting Upgrades	$22,166.31	419	107,596.18	0.0	$9,460.00	$31,626.31	$21,100.00	$1,057,163.89	32.8
Exterior Lighting Upgrades	$5,100.90	0	35,959.80	0.0	$250.00	$5,350.90	$0.00	$43,871.71	8.2
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$9,910.46	0	67,642.43	0.0	$0.00	$9,910.46	$0.00	$102,877.52	10.4
Air Handling Unit Upgrade/Replacement	$106.52	0	-28,167.27	469.2	$0.00	$106.52	$0.00	$530,419.94	4,979.3
BMS & Controls Upgrade	$12,552.78	0	0.00	1,544.9	$9,194.10	$21,746.88	$0.00	$115,220.50	5.3
Computer Energy Manager	$7,071.00	0	53,375.72	0.0	$0.00	$7,071.00	$0.00	$11,318.84	1.6
Plug Load Managers	$3,015.03	0	20,351.17	0.0	$0.00	$3,015.03	$0.00	$19,957.39	6.6
Envelope Improvements	$3,601.08	0	0.00	467.5	$0.00	$3,601.08	$0.00	$55,960.66	15.5
Insulation Improvement	$1,175.36	0	0.00	145.0	$0.00	$1,175.36	$0.00	$23,671.87	20.1
Total	$154,177	419	813,370	2,627	$18,904	$173,082	$21,100	$3,055,005	17.5

R. M. Finley Middle School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Interior Lighting Upgrades	$30,694.20	533	$154,391.00	0	$10,231.00	$40,925.20	$0	$459,056.82	11.2
Exterior Lighting Upgrades	$3,498.99	0	$24,966.00	0	$153.00	$3,651.99	$0	$22,044.53	6.0
Boiler/Burner Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
VFDs and Motor Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
BMS & Controls Upgrade	$0.00	0	$0.00	0	$0.00	$0.00	$0	$90,785.64	-
Computer Energy Manager	$5,589.00	0	$42,186.47	0	$5,000.00	$10,589.00	$0	$8,946.06	0.8
Plug Load Managers	$3,116.00	0	$23,052.99	0	$0.00	$3,116.00	$0	$18,253.71	5.9
Envelope Improvements	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Insulation Improvement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Total	$42,898	533	244,596	0	$15,384	$58,282	$0	$599,087	10.3

Connolly Elementary School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0.0	$0.00	$0.00	$0	$0.00	-
Interior Lighting Upgrades	$3,799.71	72	17945.46	0.0	$2,412.00	$6,211.71	$0	$115,237.40	18.6
Exterior Lighting Upgrades	$2,418.76	0	16922.19	0.0	$76.50	$2,495.26	$0	$7,458.51	3.0
Boiler/Burner Upgrade/Replacement	$11,682.00	0	0.00	1436.9	$7,877.50	$19,559.50	$0	$598,798.91	30.6
VFDs and Motor Replacement	$7,395.03	0	48316.02	0.0	$0.00	$7,395.03	$0	$39,900.29	5.4
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0	$0.00	-
BMS & Controls Upgrade	$5,167.80	0	0.00	639.8	$0.00	$5,167.80	$0	$90,978.80	17.6
Computer Energy Manager	$1,350.59	0	9525.98	0.0	$0.00	$1,350.59	$0	$2,020.08	1.5
Plug Load Managers	$1,986.84	0	13411.03	0.0	$0.00	$1,986.84	$0	$10,465.46	5.3
Envelope Improvements	$1,696.66	0	0.00	179.2	$0.00	$1,696.66	$0	$20,359.16	12.0
Insulation Improvement	$234.19	0	0.00	22.6	$0.00	$234.19	$0	$4,158.76	17.8
Total	**$35,732**	**72**	**106,121**	**2,278**	**$10,366**	**$46,098**	**$0**	**$889,377**	**19.3**

Deasy Elementary School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$11,585.69	0	$83,689.80	0	$0.00	$11,585.69	$0.00	$230,216.93	19.9
Interior Lighting Upgrades	$5,451.44	105	$25,519.49	0	$2,133.00	$7,584.44	$0.00	$114,638.94	15.1
Exterior Lighting Upgrades	$507.90	0	$4,029.61	0	$20.00	$527.90	$0.00	$1,513.10	2.9
Boiler/Burner Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$21,634.03	-
Computer Energy Manager	$1,220.00	0	$9,677.18	0	$0.00	$1,220.00	$0.00	$2,052.14	1.7
Plug Load Managers	$2,406.00	0	$17,763.75	0	$0.00	$2,406.00	$0.00	$10,465.46	4.3
Envelope Improvements	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$21,171**	**105**	**140,680**	**0**	**$2,153**	**$23,324**	**$0**	**$380,521**	**16.3**

Gribbin Elementary School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$7,942.84	0	52376.76	0.0	$0.00	$7,942.84	$0.00	$354,550.77	44.6
Interior Lighting Upgrades	$11,912.27	205	58686.58	0.0	$2,740.00	$14,652.27	$0.00	$137,710.67	9.4
Exterior Lighting Upgrades	$2,023.47	0	14156.66	0.0	$113.00	$2,136.47	$0.00	$13,537.89	6.3
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$1,650.33	0	12079.01	0.0	$0.00	$1,650.33	$0.00	$23,894.01	14.5
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$9,635.29	0	0.00	975.7	$2,006.00	$11,641.29	$0.00	$196,927.58	16.9
Computer Energy Manager	$1,393.46	0	9828.39	0.0	$0.00	$1,393.46	$0.00	$2,084.21	1.5
Plug Load Managers	$2,057.48	0	13887.84	0.0	$0.00	$2,057.48	$0.00	$11,682.37	5.7
Envelope Improvements	$3,206.49	0	0.00	331.7	$0.00	$3,206.49	$0.00	$27,556.34	8.6
Insulation Improvement	$1,130.52	0	0.00	97.7	$0.00	$1,130.52	$0.00	$12,503.31	11.1
Total	**$40,952**	**205**	**161,015**	**1,405**	**$4,859**	**$45,811**	**$0**	**$780,447**	**17.0**

Landing Elementary School Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$20,037.34	0	132159.54	0.0	$0.00	$20,037.34	$0.00	$121,081.00	6.0
Interior Lighting Upgrades	$6,968.13	135	32486.60	0.0	$2,285.00	$9,253.13	$0.00	$115,666.67	12.5
Exterior Lighting Upgrades	$2,131.63	0	14913.35	0.0	$90.00	$2,221.63	$0.00	$12,513.63	5.6
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$9,438.00	0	0.00	1,168.4	$1,190.00	$10,628.00	$0.00	$57,368.80	5.4
Computer Energy Manager	$1,500.64	0	10584.42	0.0	$0.00	$1,500.64	$0.00	$2,244.53	1.5
Plug Load Managers	$2,117.05	0	14813.16	0.0	$0.00	$2,117.05	$0.00	$8,518.40	4.0
Envelope Improvements	$5,697.41	0	0.00	540.4	$0.00	$5,697.41	$0.00	$130,970.84	23.0
Insulation Improvement	$1,988.52	0	0.00	170.9	$0.00	$1,988.52	$0.00	$33,820.55	17.0
Total	**$49,879**	**135**	**204,957**	**1,880**	**$3,565**	**$53,444**	**$0**	**$482,184**	**9.0**

Admin / Thayer House

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$1,205.40	23	5695.21	0	$444.00	$1,649.40	$0.00	$12,925.89	7.8
Exterior Lighting Upgrades	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$273.00	0	2168.00	0	$0.00	$273.00	$0.00	$641.29	2.3
Plug Load Managers	$293.00	0	2165.00	0	$0.00	$293.00	$0.00	$1,460.30	5.0
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$1,771	23	10,028	0	$444	$2,215	$0	$15,027	6.8

Carriage House

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$453.47	0	1,900.12	0	$156.00	$609.47	$0.00	$4,415.03	7.2
Exterior Lighting Upgrades	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$229.00	0	1,084.00	0	$0.00	$229.00	$0.00	$320.65	1.4
Plug Load Managers	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$682	0.00	2,984	0	$156	$838	$0	$4,736	5.6

Maintenance Garage

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$1,384.80	28	6,356.38	0	$463.00	$1,847.80	$0.00	$11,853.65	6.4
Exterior Lighting Upgrades	$571.14	0	4,029.60	0	$20.00	$591.14	$0.00	$1,513.10	2.6
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Plug Load Managers	$126.00	0	917.00	0	$0.00	$126.00	$0.00	$486.77	3.9
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$2,082	28	11,303	0	$483	$2,565	$0	$13,854	5.4

Glen Cove High School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$89,478.05	0	556,611.77	0.0	$0.00	$89,478.05	$0.00	$1,094,542.60	12.2
Interior Lighting Upgrades	$22,166.31	419	107,596.18	0.0	$9,460.00	$31,626.31	$21,100.00	$1,057,163.89	32.8
Exterior Lighting Upgrades	$5,100.90	0	35,959.80	0.0	$250.00	$5,350.90	$0.00	$43,871.71	8.2
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$9,910.46	0	67,642.43	0.0	$0.00	$9,910.46	$0.00	$102,877.52	10.4
Air Handling Unit Upgrade/Replacement	$106.52	0	-28,167.27	469.2	$0.00	$106.52	$0.00	$530,419.94	4,979.3
BMS & Controls Upgrade	$12,552.78	0	0.00	1,544.9	$9,194.10	$21,746.88	$0.00	$115,220.50	5.3
Computer Energy Manager	$7,071.00	0	53,375.72	0.0	$0.00	$7,071.00	$0.00	$11,318.84	1.6
Plug Load Managers	$3,015.03	0	20,351.17	0.0	$0.00	$3,015.03	$0.00	$19,957.39	6.6
Envelope Improvements	$3,601.08	0	0.00	467.5	$0.00	$3,601.08	$0.00	$55,960.66	15.5
Insulation Improvement	$1,175.36	0	0.00	145.0	$0.00	$1,175.36	$0.00	$23,671.87	20.1
Total	$154,177	419	813,370	2,627	$18,904	$173,082	$21,100	$3,055,005	17.5

Identified Problems and Solutions

1. The existing 1'x1' ceiling tiles will not support new lighting fixtures, so all 1'x1' ceilings will be replaced with new drop ceilings and new lighting fixtures.

2. Old TV Studio RTUs are inefficient and require significant maintenance. Centralizing operation into one new unit will increase efficiency and reduce maintenance costs.
3. Controls were minimal and inefficient. A new BMS will control the heating and fresh air of major equipment, ensuring ease of use throughout the school.

Measures Implemented

1. Solar PV:
   - 390 kW of solar PV installed on rooftops, offsetting 82% of the school's electrical consumption
2. Lighting:
   - All 1'x1' ceilings replaced with new drop ceilings
   - New LED lighting fixtures throughout the building
3. VFDs and Motor Upgrades:
   - New motors and VFDs for four hot water distribution pumps
4. Ventilation Upgrades:
   - New single RTU unit for the TV Studio to replace three existing RTUs serving the same space
   - New RTU unit for the Auditorium to switch to electric heating and reduce maintenance issues
5. BMS Upgrade:
   - New BMS with controls on major equipment, allowing for easier and more reliable control of the building's energy ecosystem
6. Computer Energy Manager
   - Remote control over desktop computers in the school allowing for scheduling to minimize wasted energy
7. Plug Load Managers
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units
8. Envelope Improvements
   - New door weather stripping, overhang air sealing, and roof-wall intersection air sealing, creating a tighter building envelope to minimizing air infiltration and wasted energy
9. Mechanical Insulation
   - New insulation on heating pipes ensures minimal energy waste and reduces overheating

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R. M. Finley Middle School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Interior Lighting Upgrades	$30,694.20	533	$154,391.00	0	$10,231.00	$40,925.20	$0	$459,056.82	11.2
Exterior Lighting Upgrades	$3,498.99	0	$24,966.00	0	$153.00	$3,651.99	$0	$22,044.53	6.0
Boiler/Burner Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
VFDs and Motor Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
BMS & Controls Upgrade	$0.00	0	$0.00	0	$0.00	$0.00	$0	$90,785.64	-
Computer Energy Manager	$5,589.00	0	$42,186.47	0	$5,000.00	$10,589.00	$0	$8,946.06	0.8
Plug Load Managers	$3,116.00	0	$23,052.99	0	$0.00	$3,116.00	$0	$18,253.71	5.9
Envelope Improvements	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Insulation Improvement	$0.00	0	$0.00	0	$0.00	$0.00	$0	$0.00	-
Total	**$42,898**	**533**	**244,596**	**0**	**$15,384**	**$58,282**	**$0**	**$599,087**	**10.3**

Measures Implemented

1. Lighting:
   - New LED lighting fixtures throughout the building, excluding places where asbestos abatement would be required. In the locations containing asbestos, LED ballast-bypass tubes will be installed
2. BMS Upgrade:
   - New BMS with controls on major equipment, allowing for easier and more reliable control of the building's energy ecosystem
3. Computer Energy Manager:
   - Remote control over desktop computers in the school, allowing for scheduling to minimize wasted energy
4. Plug Load Managers:
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units

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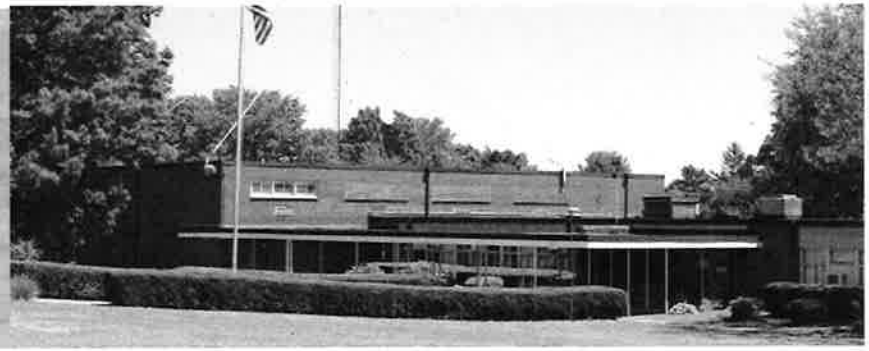

Connolly Elementary School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0.0	$0.00	$0.00	$0	$0.00	-
Interior Lighting Upgrades	$3,799.71	72	17945.46	0.0	$2,412.00	$6,211.71	$0	$115,237.40	18.6
Exterior Lighting Upgrades	$2,418.76	0	16922.19	0.0	$76.50	$2,495.26	$0	$7,458.51	3.0
Boiler/Burner Upgrade/Replacement	$11,682.00	0	0.00	1436.9	$7,877.50	$19,559.50	$0	$598,798.91	30.6
VFDs and Motor Replacement	$7,395.03	0	43316.02	0.0	$0.00	$7,395.03	$0	$39,900.29	5.4
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0	$0.00	-
BMS & Controls Upgrade	$5,167.80	0	0.00	639.8	$0.00	$5,167.80	$0	$90,978.80	17.6
Computer Energy Manager	$1,350.59	0	9525.98	0.0	$0.00	$1,350.59	$0	$2,020.08	1.5
Plug Load Managers	$1,986.84	0	13411.03	0.0	$0.00	$1,986.84	$0	$10,465.46	5.3
Envelope Improvements	$1,696.66	0	0.00	179.2	$0.00	$1,696.66	$0	$20,359.16	12.0
Insulation Improvement	$234.19	0	0.00	22.6	$0.00	$234.19	$0	$4,158.76	17.8
Total	**$35,732**	**72**	**106,121**	**2,278**	**$10,366**	**$46,098**	**$0**	**$889,377**	**19.3**

Identified Problems and Solutions

1. Ecosystem will replace the existing hot-air furnaces with two new condensing hot-water boilers to handle Connolly's heating load. This includes new coil to be installed in the supply ductwork that will heat the air more efficiently with hot water.
2. Connolly was not on the Metasys platform, which led to controls issues when the furnace would trip into alarm during off hours. The new BMS will allow for remote control over the boilers and main air handling unit.

Measures Implemented

1. Lighting:
   - New LED lighting fixtures throughout the building
2. Boiler Upgrades:
   - Two new hot water condensing boilers to replace the existing furnaces
     - Includes abatement, demolition of the existing furnaces, new piping, hot water coil, pumps, chimney relining, and new PVC stack
3. VFDs and Motor Upgrades:
   - New motors and VFDs for the supply air fan
4. BMS Upgrade:
   - New BMS with controls on major equipment and new equipment, allowing for easier and more reliable control of the building's energy ecosystem
5. Computer Energy Manager:
   - Remote controls over desktop computers in the school allowing for scheduling to minimize wasted energy
6. Plug Load Managers:
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units
7. Envelope Improvements:
   - New door weather stripping and roof-wall intersection air sealing, creating a tighter building envelope and minimizing air infiltration and wasted energy
8. Mechanical Insulation:
   - New insulation on heating pipes ensuring minimal energy waste and reducing overheating

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Deasy Elementary School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$11,585.69	0	$83,689.80	0	$0.00	$11,585.69	$0.00	$230,216.93	19.9
Interior Lighting Upgrades	$5,451.44	105	$25,519.49	0	$2,133.00	$7,584.44	$0.00	$114,638.94	15.1
Exterior Lighting Upgrades	$507.90	0	$4,029.61	0	$20.00	$527.90	$0.00	$1,513.10	2.9
Boiler/Burner Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$21,634.03	-
Computer Energy Manager	$1,220.00	0	$9,677.18	0	$0.00	$1,220.00	$0.00	$2,052.14	1.7
Plug Load Managers	$2,406.00	0	$17,763.75	0	$0.00	$2,406.00	$0.00	$10,465.46	4.3
Envelope Improvements	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	$0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$21,171	105	140,680	0	$2,153	$23,324	$0	$380,521	16.3

Identified Problems and Solutions

1. Solar PV will offset 100% of Deasy's electrical usage. This massively reduces the school's environmental impact and will minimize the cost to operate the building for decades to come.
2. Ecosystem will implement a new BMS for the heating plant at Deasy Elementary School that serves both Deasy and Finley Middle School. This will improve the usability of the BMS and will centralize controls through the district.

Measures Implemented

1. Solar PV:
   - 65.1 kW of solar PV installed on rooftops, offsetting 100% of the school's electrical consumption
2. Lighting:
   - New LED lighting fixtures throughout the building
3. BMS Upgrade:
   - New BMS with controls on major equipment, allowing for easier and more reliable control of the building's energy ecosystem
4. Computer Energy Manager:
   - Remote control over desktop computers in the school, allowing for scheduling to minimize wasted energy
5. Plug Load Managers:
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units

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Gribbin Elementary School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$7,942.84	0	52376.76	0.0	$0.00	$7,942.84	$0.00	$354,550.77	44.6
Interior Lighting Upgrades	$11,912.27	205	58686.58	0.0	$2,740.00	$14,652.27	$0.00	$137,710.67	9.4
Exterior Lighting Upgrades	$2,023.47	0	14156.66	0.0	$113.00	$2,136.47	$0.00	$13,537.89	6.3
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$1,650.33	0	12079.01	0.0	$0.00	$1,650.33	$0.00	$23,894.01	14.5
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$9,635.29	0	0.00	975.7	$2,006.00	$11,641.29	$0.00	$196,927.58	16.9
Computer Energy Manager	$1,393.46	0	9828.39	0.0	$0.00	$1,393.46	$0.00	$2,084.21	1.5
Plug Load Managers	$2,057.48	0	13887.84	0.0	$0.00	$2,057.48	$0.00	$11,682.37	5.7
Envelope Improvements	$3,206.49	0	0.00	331.7	$0.00	$3,206.49	$0.00	$27,556.34	8.6
Insulation Improvement	$1,130.52	0	0.00	97.7	$0.00	$1,130.52	$0.00	$12,503.31	11.1
Total	**$40,952**	**205**	**161,015**	**1,405**	**$4,859**	**$45,811**	**$0**	**$780,447**	**17.0**

Identified Problems and Solutions

1. Ecosystem will install a solar PV array at Gribbin Elementary School that will be net-metered to Landing Elementary School to offset electrical usage at both schools.
2. Ecosystem will install all existing control points to a new BMS system, replacing the outdated Metasys.

Measures Implemented

1. Solar PV:
   - 114 kW of solar PV installed on rooftops, offsetting 100% of the school's electrical consumption and allowing for remote net metering to Landing Elementary School
2. Lighting:
   - New LED lighting fixtures throughout the building
3. VFDs and Motor Upgrades:
   - New motor and VFD for the main hot water distribution pump
4. BMS Upgrade:
   - New BMS with controls on major equipment, allowing for easier and more reliable control of the building's energy ecosystem
5. Computer Energy Manager
   - Remote controls over desktop computers in the school allowing for scheduling to minimize wasted energy
6. Plug Load Managers
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units
7. Envelope Improvements
   - New door weather stripping, buck frame air sealing, overhang air sealing, and roof-wall intersection air sealing, creating a tighter building envelope and minimizing air infiltration and wasted energy
8. Mechanical Insulation
   - New insulation on heating pipes, reducing energy waste and overheating

GT

Landing Elementary School

Financial Breakdown

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$20,037.34	0	132159.54	0.0	$0.00	$20,037.34	$0.00	$121,081.00	6.0
Interior Lighting Upgrades	$6,968.13	135	32486.60	0.0	$2,285.00	$9,253.13	$0.00	$115,666.67	12.5
Exterior Lighting Upgrades	$2,131.63	0	14913.35	0.0	$90.00	$2,221.63	$0.00	$12,513.63	5.6
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0.0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$9,438.00	0	0.00	1,168.4	$1,190.00	$10,628.00	$0.00	$57,368.80	5.4
Computer Energy Manager	$1,500.64	0	10584.42	0.0	$0.00	$1,500.64	$0.00	$2,244.53	1.5
Plug Load Managers	$2,117.05	0	14813.16	0.0	$0.00	$2,117.05	$0.00	$8,518.40	4.0
Envelope Improvements	$5,697.41	0	0.00	540.4	$0.00	$5,697.41	$0.00	$130,970.84	23.0
Insulation Improvement	$1,988.52	0	0.00	170.9	$0.00	$1,988.52	$0.00	$33,820.55	17.0
Total	$49,879	135	204,957	1,880	$3,565	$53,444	$0	$482,184	9.0

Identified Problems and Solutions

1. Controls were on an outdated Metasys platform. Ecosystem will install a new BMS, replacing the Metasys.

Measures Implemented

1. Solar PV:
   - 25 kW of solar PV installed on rooftops and sloped roof sections. As roof space is limited, production from Gribbin Elementary will also be net metered to Landing Elementary to offset a total 100% of the school's electrical consumption
2. Lighting:
   - New LED lighting fixtures throughout the building
3. BMS Upgrade:
   - New BMS with controls on major equipment, allowing for easier and more reliable control of the building's energy ecosystem
4. Computer Energy Manager:
   - Remote controls over desktop computers in the school, allowing for scheduling to minimize wasted energy
5. Plug Load Managers:
   - Remote controls and scheduling for large appliances such as projectors, copiers, printers, and window AC units
6. Envelope Improvements:
   - New flat attic insulation with new walkways and a new hatch, door weather stripping, and roof-wall intersection air sealing, creating a tighter building envelope and reducing heat loss through ceiling and air infiltration
7. Mechanical Insulation:
   - New insulation on heating pipes, reducing energy waste and overheating

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Thayer, Carriage, & Garage

Financial Breakdown

Admin / Thayer House

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$1,205.40	23	5695.21	0	$444.00	$1,649.40	$0.00	$12,925.89	7.8
Exterior Lighting Upgrades	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$273.00	0	2168.00	0	$0.00	$273.00	$0.00	$641.29	2.3
Plug Load Managers	$293.00	0	2165.00	0	$0.00	$293.00	$0.00	$1,460.30	5.0
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$1,771	23	10,028	0	$444	$2,215	$0	$15,027	6.8

Carriage House

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$453.47	0	1,900.12	0	$156.00	$609.47	$0.00	$4,415.03	7.2
Exterior Lighting Upgrades	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$229.00	0	1,084.00	0	$0.00	$229.00	$0.00	$320.65	1.4
Plug Load Managers	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	$682	0.00	2,984	0	$156	$838	$0	$4,736	5.6

Maintenance Garage

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Measure Cost	Simple Payback (Years)
Solar PV	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Interior Lighting Upgrades	$1,384.80	28	6,356.38	0	$463.00	$1,847.80	$0.00	$11,853.65	6.4
Exterior Lighting Upgrades	$571.14	0	4,029.60	0	$20.00	$591.14	$0.00	$1,513.10	2.6
Boiler/Burner Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
VFDs and Motor Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Air Handling Unit Upgrade/Replacement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
BMS & Controls Upgrade	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Computer Energy Manager	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Plug Load Managers	$126.00	0	917.00	0	$0.00	$126.00	$0.00	$486.77	3.9
Envelope Improvements	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Insulation Improvement	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$2,082**	**28**	**11,303**	**0**	**$483**	**$2,565**	**$0**	**$13,854**	5.4

Measures Implemented

1. Lighting:
   - Tube and ballast bypass upgrades for fixtures throughout the buildings
2. Computer Energy Manager
   - Remote controls over desktop computers in the buildings, allowing for scheduling to minimize wasted energy
3. Plug Load Managers
   - Remote controls and scheduling for appliances such as copiers, printers, and window AC units

TECHNICAL ASPECTS

Per Measure Breakdowns

Solar PV

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$89,478.05	0	556,611.77	0	$0.00	$89,478.05	$0.00	$1,094,542.60	12.2
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Deasy ES	$11,585.69	0	83,689.80	0	$0.00	$11,585.69	$0.00	$230,216.93	19.9
Gribbin ES	$7,942.84	0	52,376.76	0	$0.00	$7,942.84	$0.00	$354,550.77	44.6
Landing ES	$20,037.34	0	132,159.54	0	$0.00	$20,037.34	$0.00	$121,081.00	6.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$129,044**	**0**	**824,838**	**0**	**$0**	**$129,044**	**$0**	**$1,800,391**	**14.0**

Interior Lighting

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$22,166.31	419.4	107,596.18	0	$9,460.00	$31,626.31	$21,100.00	$1,057,163.89	32.8
R.M. Finley MS	$30,694.20	533.0	154,391.00	0	$10,231.00	$40,925.20	$0.00	$459,056.82	11.2
Connolly ES	$3,799.71	71.8	17,945.46	0	$2,412.00	$6,211.71	$0.00	$115,237.40	18.6
Deasy ES	$5,451.44	104.8	25,519.49	0	$2,133.00	$7,584.44	$0.00	$114,638.94	15.1
Gribbin ES	$11,912.27	205.5	58,686.58	0	$2,740.00	$14,652.27	$0.00	$137,710.67	9.4
Landing ES	$6,968.13	135.1	32,486.60	0	$2,285.00	$9,253.13	$0.00	$115,666.67	12.5
Admin/Thayer House	$1,205.40	22.7	5,695.21	0	$444.00	$1,649.40	$0.00	$12,925.89	7.8
Carriage House	$453.47	0.0	1,900.12	0	$156.00	$609.47	$0.00	$4,415.03	7.2
Bus Garage / Shop	$1,384.80	27.6	6,356.38	0	$463.00	$1,847.80	$0.00	$11,853.65	6.4
Total	**$84,036**	**1520**	**410,577**	**0**	**$30,324**	**$114,360**	**$21,100**	**$2,028,669**	**17.6**

Exterior Lighting

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$5,100.90	0	35,959.80	0	$250.00	$5,350.90	$0.00	$43,871.71	8.2
R.M. Finley MS	$3,498.99	0	24,966.00	0	$153.00	$3,651.99	$0.00	$22,044.53	6.0
Connolly ES	$2,418.76	0	16,922.19	0	$76.50	$2,495.26	$0.00	$7,458.51	3.0
Deasy ES	$507.90	0	4,029.61	0	$20.00	$527.90	$0.00	$1,513.10	2.9
Gribbin ES	$2,023.47	0	14,156.66	0	$113.00	$2,136.47	$0.00	$13,537.89	6.3
Landing ES	$2,131.63	0	14,913.35	0	$90.00	$2,221.63	$0.00	$12,513.63	5.6
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$571.14	0	4,029.60	0	$20.00	$591.14	$0.00	$1,513.10	2.6
Total	**$16,253**	**0**	**114,977**	**0**	**$723**	**$16,975**	**$0**	**$102,452**	**6.0**

Boiler Upgrade

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$11,682.00	0	0.00	1,437	$7,877.50	$19,559.50	$0.00	$598,798.91	30.6
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$11,682**	**0**	**0**	**1,437**	**$7,878**	**$19,560**	**$0**	**$598,799**	**30.6**

VFDs & Motor Replacement

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$9,910.46	0	67,642.43	0	$0.00	$9,910.46	$0.00	$102,877.52	10.4
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$7,395.03	0	48,316.02	0	$0.00	$7,395.03	$0.00	$39,900.29	5.4
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$1,650.33	0	12,079.01	0	$0.00	$1,650.33	$0.00	$23,894.01	14.5
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$18,956**	**0**	**128,037**	**0**	**$0**	**$18,956**	**$0**	**$166,672**	**8.8**

Ventilation Upgrades

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$106.52	0	-28,167.27	469	$0.00	$106.52	$0.00	$530,419.94	4,979.3
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$107**	**0**	**-28,167**	**469**	**$0**	**$107**	**$0**	**$530,420**	**4,979.3**

BMS & Controls Upgrades

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$12,552.78	0	0.00	1,545	$9,194.10	$21,746.88	$0.00	$115,220.50	5.3
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$90,785.64	-
Connolly ES	$5,167.80	0	0.00	640	$0.00	$5,167.80	$0.00	$90,978.80	17.6
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$21,634.03	-
Gribbin ES	$9,635.29	0	0.00	976	$2,006.00	$11,641.29	$0.00	$196,927.58	16.9
Landing ES	$9,438.00	0	0.00	1,168	$1,190.00	$10,628.00	$0.00	$57,368.80	5.4
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$36,794**	**0**	**0**	**4,329**	**$12,390**	**$49,184**	**$0**	**$572,915**	**11.6**

Computer Energy Manager

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$7,071.00	0	53,375.72	0	$0.00	$7,071.00	$0.00	$11,318.84	1.6
R.M. Finley MS	$5,589.00	0	42,186.47	0	$5,000.00	$10,589.00	$0.00	$8,946.06	0.8
Connolly ES	$1,350.59	0	9,525.98	0	$0.00	$1,350.59	$0.00	$2,020.08	1.5
Deasy ES	$1,220.00	0	9,677.18	0	$0.00	$1,220.00	$0.00	$2,052.14	1.7
Gribbin ES	$1,393.46	0	9,828.39	0	$0.00	$1,393.46	$0.00	$2,084.21	1.5
Landing ES	$1,500.64	0	10,584.42	0	$0.00	$1,500.64	$0.00	$2,244.53	1.5
Admin/Thayer House	$273.00	0	2,168.00	0	$0.00	$273.00	$0.00	$641.29	2.3
Carriage House	$229.00	0	1,084.00	0	$0.00	$229.00	$0.00	$320.65	1.4
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$18,627**	**0**	**138,430**	**0**	**$5,000**	**$23,627**	**$0**	**$29,628**	**1.3**

Plug Load Managers

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$3,015.03	0	20,351.17	0	$0.00	$3,015.03	$0.00	$19,957.39	6.6
R.M. Finley MS	$3,116.00	0	23,052.99	0	$0.00	$3,116.00	$0.00	$18,253.71	5.9
Connolly ES	$1,986.84	0	13,411.03	0	$0.00	$1,986.84	$0.00	$10,465.46	5.3
Deasy ES	$2,406.00	0	17,763.75	0	$0.00	$2,406.00	$0.00	$10,465.46	4.3
Gribbin ES	$2,057.48	0	13,887.84	0	$0.00	$2,057.48	$0.00	$11,682.37	5.7
Landing ES	$2,117.05	0	14,813.16	0	$0.00	$2,117.05	$0.00	$8,518.40	4.0
Admin/Thayer House	$293.00	0	2,165.00	0	$0.00	$293.00	$0.00	$1,460.30	5.0
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$126.00	0	917.00	0	$0.00	$126.00	$0.00	$486.77	3.9
Total	**$15,117**	**0**	**106,362**	**0**	**$0**	**$15,117**	**$0**	**$81,290**	**5.4**

Envelope Improvements

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$3,601.08	0	0.00	467	$0.00	$3,601.08	$0.00	$55,960.66	15.5
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$1,696.66	0	0.00	179	$0.00	$1,696.66	$0.00	$20,359.16	12.0
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$3,206.49	0	0.00	332	$0.00	$3,206.49	$0.00	$27,556.34	8.6
Landing ES	$5,697.41	0	0.00	540	$0.00	$5,697.41	$0.00	$130,970.84	23.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$14,202**	**0**	**0**	**1,519**	**$0**	**$14,202**	**$0**	**$234,847**	**16.5**

Mechanical Insulation

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$1,175.36	0	0.00	145	$0.00	$1,175.36	$0.00	$23,671.87	20.1
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$234.19	0	0.00	23	$0.00	$234.19	$0.00	$4,158.76	17.8
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$1,130.52	0	0.00	98	$0.00	$1,130.52	$0.00	$12,503.31	11.1
Landing ES	$1,988.52	0	0.00	171	$0.00	$1,988.52	$0.00	$33,820.55	17.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$4,529**	**0**	**0**	**436**	**$0**	**$4,529**	**$0**	**$74,154**	**16.4**

CT

MEASURE 1

Solar PV

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$89,478.05	0	556,611.77	0	$0.00	$89,478.05	$0.00	$1,094,542.60	12.2
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Deasy ES	$11,585.69	0	83,689.80	0	$0.00	$11.585.69	$0.00	$230,216.93	19.9
Gribbin ES	$7,942.84	0	52,376.76	0	$0.00	$7,942.84	$0.00	$354,550.77	44.6
Landing ES	$20,037.34	0	132,159.54	0	$0.00	$20,037.34	$0.00	$121,081.00	6.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$129,044**	**0**	**824,838**	**0**	**$0**	**$129,044**	**$0**	**$1,800,391**	**14.0**

Reason for Selection

Photovoltaic (PV) solar arrays present a unique opportunity to massively reduce the district's energy bill by producing clean, carbon-free electricity on site. This electricity will go directly to the school buildings offsetting on site electrical usage. This reduces the consumption measured by the utility and cuts the district's electrical usage by 31% of base year usage.

Scope

Ecosystem will install new rooftop solar PV systems at four schools in the district.

- This include panels, racking, ballast, inverters, interconnection to existing electrical infrastructure, and all safety devices as required by code.

- Ecosystem will provide the district with means of monitoring the output of their new solar PV systems.
- Ecosystem will set up Glen Cove's electrical accounts to net meter production from Gribbin Elementary School to Landing Elementary School.

Overview of Solar Systems and Production

Building	DC Capacity (kW)	kWh Produced	Panels	Inverters
Glen Cove High School	389.7	506,011	838	6
Deasy Elementary School	65.1	84,846	140	1
Gribbin Elementary School	114.4	151,816	246	2
Landing Elementary School	25.1	32,720	54	1

Savings Justification

This solar PV measure will generate major financial savings and positive cashflow by reducing the district's reliance on local utilities. Electricity generated by the solar array directly reduces the energy consumption of the building that the array is connected to or can be net metered to other buildings.

Helioscope models documenting monthly output, arrangement, and other design criteria are provided in the Appendix.

Operation and Maintenance

Solar PV systems require very little maintenance and can provide bene- fits for the district for decades to come. Ecosystem does not recommend solar maintenance contract for schools as district staff can handle any needed cleaning. Ecosystem recommends only an annual visual inspection of all solar arrays to ensure that no panels are visibly damaged or caked with dirt. If any panels are exceptionally dirty, they can be cleaned with clean water.

Equipment Installed	Useful Life
Solar Panels	30 Years
Solar Racking	30 Years
Inverters	18 Years
Electrical Wiring	30 Years

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MEASURE 2

Interior Lighting Upgrade

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$22,166.31	419.4	107,596.18	0	$9,460.00	$31,626.31	$21,100.00	$1,057,163.89	32.8
R.M. Finley MS	$30,694.20	533.0	154,391.00	0	$10,231.00	$40,925.20	$0.00	$459,056.82	11.2
Connolly ES	$3,799.71	71.8	17,945.46	0	$2,412.00	$6,211.71	$0.00	$115,237.40	18.6
Deasy ES	$5,451.44	104.8	25,519.49	0	$2,133.00	$7,584.44	$0.00	$114,638.94	15.1
Gribbin ES	$11,912.27	205.5	58,686.58	0	$2,740.00	$14,652.27	$0.00	$137,710.67	9.4
Landing ES	$6,968.13	135.1	32,486.60	0	$2,285.00	$9,253.13	$0.00	$115,666.67	12.5
Admin/Thayer House	$1,205.40	22.7	5,695.21	0	$444.00	$1,649.40	$0.00	$12,925.89	7.8
Carriage House	$453.47	0.0	1,900.12	0	$156.00	$609.47	$0.00	$4,415.03	7.2
Bus Garage / Shop	$1,384.80	27.6	6,356.38	0	$463.00	$1,847.80	$0.00	$11,853.65	6.4
Total	**$84,036**	**1520**	**410,577**	**0**	**$30,324**	**$114,360**	**$21,100**	**$2,028,669**	**17.6**

Reason for Selection

Most of the lighting throughout the district is fluorescent technology. Ecosystem will replace these, along with the rest of the lighting technology, with high efficacy LED fixtures that have a much more even distribution of light. This will allow for a reduction in the number of fixtures within a space while maintaining adequate light levels.

Scope

- Ecosystem will remove old lighting technology and install new LED technology for the interior and exterior of all 9 district buildings.
- Five of the schools (excluding R.M. Finley Middle School) will have new LED fixtures in all the classrooms, offices, hallways, and bathrooms.

- Everything else (closets, storage, mechanical rooms, etc.) will be a mix of new fixtures and lamp replacements.

- R.M. Finley Middle School will have tube fixtures replaced with LED fixtures in all locations, with some spaces that have asbestos on the ceiling getting tubes replacements. This is to avoid the cost of asbestos abatement.
  - For spaces with asbestos on the ceiling:
    - Classrooms and offices with pendant fixtures will be replaced with LED fixtures.
    - All other spaces will have a tubes replacement.
- Thayer House, Carriage House, and the Garage will have tubes replacements, not full fixture replacements.
- Many classrooms across the district will have the number of fixtures reduced and the layout of the new fixtures optimized for light distribution, as shown in the lighting simulation to the right.
- Glen Cove High School will have all 1' x 1' ceiling tiles replaced with new drop ceiling (~32,000 sq.ft.)
- Occupancy sensors will be added to spaces that currently do not have one, where required by code.
- Non-LED exit signs will be replaced by LED exit signs.

Interior

Building	School Year kW Savings	Summer kW Savings	kWh Savings
Glen Cove High School	37.16	20.64	139,855
R. M. Finley Middle School	47.35	26.31	167,987
Connolly Elementary School	6.34	3.52	34,417
Deasy Elementary School	9.32	5.18	28,974
Gribbin Elementary School	18.35	10.20	73,552
Landing Elementary School	12.04	6.69	47,326
Thayer House	2.01	1.12	5,568
Carriage House	-	-	1,857
Garage/Shop	2.46	1.37	10,300

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Building	Current Number of Fixtures	New Number of Fixtures
Glen Cove High School	2306	1722
R. M. Finley Middle School	2275	2084
Connolly Elementary School	594	405
Deasy Elementary School	485	461
Gribbin Elementary School	620	439
Landing Elementary School	477	423
Thayer House	114	114
Carriage House	37	37
Garage/Shop	94	92

New Technology	High School	Middle School	Connolly ES	Deasy ES	Gribbin ES	Landing ES	Thayer House	Carriage House	Garage	Grand Total
1' x 4' LED Panel 20W	515	291	145	79	48	237				1315
1' x 4' LED Panel 26W	483	151	210	234	238	90				1406
2' LED Strip	1	29	14	4	25	19				92
2' LED T8 (1)		11					3	3	1	18
2' LED T8 (2)		15					6			21
2' x 2' LED Panel		143			7					150
2' x 4' LED Panel	617	444	22	40	76	45				1244
4' LED Strip	53	250	7	80		27				417
4' LED T8 (1)	4	391					90	30	6	521
4' LED T8 (2)		276					4	2	85	367
4' LED T8 (3)							3			3
4' LED T8 (4)		6			2			2		10
LED A19	17	42	4	22	19	5	5			114
LED Candelabra (1)		12					3			15
LED High Bay	10			2						12
LED Par 38		15								15
LED Wall Pack			3							3
Recessed High Bay		8			24					32
RT8	22									22
Grand Total	1722	2084	405	461	439	423	114	37	92	5777

GT

Operation and Maintenance

All of the LED fixtures being installed have a much longer rated lifespan when compared to fluorescent lighting. Each fixture is also a self-contained unit, so swapping out a fixture is much easier than swapping out bulbs and ballasts. This means that the fixtures won't have to be maintained as often, and when they do, it's a quick fix. The number of fixtures across the district will also be reduced by 17.5%, meaning there will be much fewer fixtures to maintain.

Equipment Installed	Rated Lifespan
LED Panel	50,000 hours
LED Ballast Bypass Tube	50,000 hours
LED Strip	100,000 hours
LED Recessed High Bay	100,000 hours
LED High Bay	218,000 hours
LED A19 Bulb	11,000 hours

GT

MEASURE 3

Exterior Lighting Upgrade

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$5,100.90	0	35,959.80	0	$250.00	$5,350.90	$0.00	$43,871.71	8.2
R.M. Finley MS	$3,498.99	0	24,966.00	0	$153.00	$3,651.99	$0.00	$22,044.53	6.0
Connolly ES	$2,418.76	0	16,922.19	0	$76.50	$2,495.26	$0.00	$7,458.51	3.0
Deasy ES	$507.90	0	4,029.61	0	$20.00	$527.90	$0.00	$1,513.10	2.9
Gribbin ES	$2,023.47	0	14,156.66	0	$113.00	$2,136.47	$0.00	$13,537.89	6.3
Landing ES	$2,131.63	0	14,913.35	0	$90.00	$2,221.63	$0.00	$12,513.63	5.6
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$571.14	0	4,029.60	0	$20.00	$591.14	$0.00	$1,513.10	2.6
Total	**$16,253**	**0**	**114,977**	**0**	**$723**	**$16,975**	**$0**	**$102,452**	**6.0**

Reason for Selection

Most of the exterior lighting in the district are High Intensity Discharge (HID) bulbs, which consume a lot of energy. Installing LED fixtures and bulbs will significantly reduce the power needed, and that combined with the long run hours of exterior lights will result in energy savings.

Scope

All exterior wall packs as well as lamp posts will be replaced with new LED fixtures. Screw bulbs and plug lamps will receive a lamp replacement.

Exterior

Building	Current Number of Fixtures	New Number of Fixtures
Glen Cove High School	50	50
R. M. Finley Middle School	30	30
Connolly Elementary School	27	27
Deasy Elementary School	4	4
Gribbin Elementary School	22	22
Landing Elementary School	18	18
Thayer House	0	0
Carriage House	0	0
Garage/Shop	4	4

Row Labels	High School	Middle School	Connolly ES	Deasy ES	Gribbin ES	Landing ES	Garage	Grand Total
LED A19			13					13
LED Horizontal PL					6			6
LED Lamp Post	35	15			10	8		68
LED Wall Pack	15	15	14	4	6	10	4	68
Grand Total	50	30	27	4	22	18	4	155

Operation and Maintenance

All of the LED fixtures being installed have a much longer rated lifespan when compared to fluorescent lighting. Each fixture is also a self-contained unit, so swapping out a fixture is much easier than swapping out bulbs and ballasts. This means that the fixtures won't have to be maintained as often, and when they do, it's a quick fix. The number of fixtures across the district will also be reduced by 17.5%, meaning there will be much fewer fixtures to maintain.

CT

MEASURE 4

Boiler Replacement

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$11,682.00	0	0.00	1,437	$7,877.50	$19,559.50	$0.00	$598,798.91	30.6
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$11,682**	**0**	**0**	**1,437**	**$7,878**	**$19,560**	**$0**	**$598,799**	**30.6**

Reason for Selection

Ecosystem identified an opportunity to replace the original hot air furnace system at Connolly Elementary School with a new, condensing hot water boiler system that will save energy while reducing operating and maintenance expenses.

Scope

- Ecosystem will abate and demolish the existing hot air furnace.
- We will install a new condensing hot water boiler system with pumps and hot water coil in the existing air handling unit.
- Ecosystem will install new PVC chimney lining through existing masonry chimney.
- We will reuse the existing combustion air pathway through the mechanical room exterior door louver.

Building	Existing Heating Equipment	New Heating Equipment
Connolly Elementary School	2x Dunham-Bush 2520 MBH Hot Air Furnaces	2x AERCO Benchmark 2000 MBH Condensing Hot Water Boilers

Savings Justification

The existing hot air furnace is old and inefficient. To maintain air setpoints, the hot air furnace must operate at full blast, and cycle on and off. The new coil will operate at low temperature via the condensing hot water boilers, which both attribute to increased energy efficiency for this system. The hot air furnace is conservatively estimated to operate at 80% efficiency, and the new condensing hot water boilers will have an average efficiency of 92.5%. Detailed calculations can be found in the M&V Plan.

Operation and Maintenance

The existing hot air furnace requires thousands of dollars of maintenance every year to keep it running, and because it is the original equipment, it is well past the end of its useful life. Additionally, the local controls for the hot air furnace constantly trip into an alarm state—this is an issue when it happens in the middle of the night and maintenance personnel are needed after hours to reset the system. The new hot water boiler system will have automatic controls that will also be integrated into the new BMS (described in Measure 6), allowing schedules and sequences to be implemented and modified remotely.

Equipment Installed	Useful Life
2x Condensing Hot Water Boilers	25 years
Hot water heating coil	20 years

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MEASURE 5

VFDs and Motors

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$9,910.46	0	67,642.43	0	$0.00	$9,910.46	$0.00	$102,877.52	10.4
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$7,395.03	0	48,316.02	0	$0.00	$7,395.03	$0.00	$39,900.29	5.4
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$1,650.33	0	12,079.01	0	$0.00	$1,650.33	$0.00	$23,894.01	14.5
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$18,956**	**0**	**128,037**	**0**	**$0**	**$18,956**	**$0**	**$166,672**	**8.8**

Reason for Selection

Heating loads vary throughout the year, peaking in the winter and lessening in the shoulder seasons. Hot water pumps and large supply air handling units use electric motors to push the heated water or air to the classroom. By installing VFDs on these motors, electrical savings can be generated by reducing the speed of these motors as the heating loads decrease.

Scope

- Ecosystem will install new VFDs and motors on hot water pumps with motors larger than 5 HP, five in total.
- Ecosystem will install a new VFD and motor on the Connolly supply fan.

Control Strategies for Motors Equipped with VFDs

Building	New Motors	VFDs
Glen Cove High School	4	4
Connolly Elementary School	1	1
Gribbin Elementary School	1	1

Savings Justification

The motors throughout Glen Cove are at the end of their useful life and need to be replaced. New motors are more efficient than the current motors, which will reduce energy usage. Additionally, adding VFDs to these motors will allow the pumps and fan to modulate.

As the load of the zone decreases, the speed of the motor will decrease, and the energy usage will decrease by that ratio to the third power according to engineering fan law. Detailed calculations can be found in the M&V Plan.

Operation and Maintenance

By reducing the speed of the motors, the lifespan of the pumps and motors will be extended. Because these motors and VFDs will be added to the BMS, operation of these pumps and fan can be remotely controlled.

Equipment Installed	Useful Life
New ECM Motor	18 years
New VFD	20 years

GT

MEASURE 6

Ventilation Upgrades

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$106.52	0	-28,167.27	469	$0.00	$106.52	$0.00	$530,419.94	4,979.3
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Landing ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$107**	**0**	**-28,167**	**469**	**$0**	**$107**	**$0**	**$530,420**	**4,979.3**

Reason for Selection

Aging equipment can lead to increased energy usage and additional maintenance. During surveys, Ecosystem identified ventilation equipment that were past their useful life and were prime candidates for replacement. These new pieces of air handling equipment will be integrated into the new BMS (Measure 6).

Scope

Glen Cove High School TV Studio

- Demolition of 3x DX cooling RTUs, ductwork to remain as much aspossible.
- Installation of 1x DX cooling RTU, connect 3x supply and 3x returnductwork back to new unit.
- Install 3x zone dampers in the ductwork to each zone.

Glen Cove High School Auditorium

- Demolition of existing fan section of the AHU.
- Installation of new packaged RTU heat pump, to connect to existing fresh air supply.
- Installation of new ductwork to connect new supply to coil section of the AHU.

Ventilation Upgrades Table

Building	Existing Equipment	New Equipment
Glen Cove High School	Auditorium AHU 3x DX Cooling H-Type RTUs	Auditorium Heat Pump RTU 1x DX Cooling H-Type RTU

Savings Justification

At the High School, the new RTUs will have more efficient motors and cooling than the existing systems, reducing their electricity consumption. The TV studio originally had three RTUs serving the same space. Each of those DX compressors were slightly oversized to ensure they could handle the peak cooling load. By combining the units into one, that extraneous redundance can be removed, leading to a more efficient system.

Detailed calculations can be found in the M&V Plan.

GT

Operation and Maintenance

By reducing the speed of the motors, the lifespan of the fan and motors will be extended. Because these motors and VFDs will be added to the BMS, operation of these pumps and fan can be remotely controlled. Combining three rooftop units into a single unit will also reduce the required maintenance with the lower number of units.

Equipment Installed	Useful Life
RTU Heat Pump	18 years
RTU with DX Cooling	18 years
Control actuators	20 years

GT

MEASURE 7

BMS and Controls

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$12,552.78	0	0.00	1,545	$9,194.10	$21,746.88	$0.00	$115,220.50	5.3
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$90,785.64	-
Connolly ES	$5,167.80	0	0.00	640	$0.00	$5,167.80	$0.00	$90,978.80	17.6
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$21,634.03	-
Gribbin ES	$9,635.29	0	0.00	976	$2,006.00	$11,641.29	$0.00	$196,927.58	16.9
Landing ES	$9,438.00	0	0.00	1,168	$1,190.00	$10,628.00	$0.00	$57,368.80	5.4
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$36,794**	**0**	**0**	**4,329**	**$12,390**	**$49,184**	**$0**	**$572,915**	**11.6**

Reason for Selection

As part of the detailed study, Ecosystem has analyzed the operation of the different electromechanical systems of the different schools through the BMS. This has shown several opportunities to improve operations while maintaining proper building comfort levels.

Scope

- Ecosystem will implement a new, integrated BMS at all schools to replace the existing Metasys control platform.
- All existing control points from the Metasys will be migrated to the new BMS.

GT

- At Connolly Elementary, the new boilers and main supply fan will be added to the BMS.
  - The dampers will receive new actuators to turn off the fresh air when the school is unoccupied.
  - The distribution system and fresh air rate during occupied hours will not be modified.
- Additional control points will be added to the BMS where Ecosystem determined that better control would lead to energy savings (e.g. Exhaust fans throughout the district, Start/Stop on the fans of Gribbin's unit ventilators, etc.).

New BMS Platform

Ecosystem will install a new BMS platform and migrate all existing control points on to this new system, eliminating the old Metasys platform that is outdated and causing schedule and sequence problems. Ecosystem has identified additional opportunities for energy savings, such as adding exhaust fans throughout the district, and the hot water unit ventilator fans at Gribbin Elementary. The new boiler system installed at Connolly will have new controls that will be on the new BMS platform, bringing centralized controls to this school for the first time.

Building	Control Points
Glen Cove High School	199
Finley Middle School	144
Connolly Elementary School	34
Deasy Elementary School	36
Gribbin Elementary School	67
Landing Elementary School	60
Total	540

Savings Justification

To properly maintain comfort in classrooms, fresh air is heated either via main air handling units or unit ventilators. As students and faculty use the rooms, the air needs to be removed via exhaust fans to remove the build-dup of carbon dioxide produced from the occupants' breath. However, when exhaust fans are not properly controlled, schools can over-remove the heated air, which then requires more fresh air to make up for the loss. This extra fresh air requires additional heating, which leads to increased and excessive energy usage.

CT

The exhaust fan example can be applied to air handling units, rooftop units, boiler cycling, etc. when it comes to improper control. Ecosystem has identified the systems in the school that, when properly controlled via schedules, nighttime setbacks, and sequences, will produce energy savings. When fresh air dampers are shut during unoccupied periods, energy usage will decrease, as the only energy usage will be to make up for the perimeter heat loss, instead of heating fresh air. Detailed calculations can be found in the M&V plan.

While Ecosystem's holistic approach to controls optimization generates savings using equipment around the buildings, individual sub-measures generate energy savings. The following explains how the identified sub-measures create savings:

Schedules

- Controlling the exhaust fans will eliminate heating losses at night when air does not need to pass through the building. When the building needs to be pre-heated before the school day starts, the ventilation system can focus on heating the air inside the building instead of air that infiltrates into the building.

Boiler Optimization

- Boiler sequences will be reviewed and optimized to reduce boiler cycling.

Operation and Maintenance

By reducing run hours on exhaust ventilation equipment, this measure will reduce the frequency of maintenance needed. This measure will also reduce the run hours and average output of the buildings heating and cooling systems.

Adding additional equipment to the existing BMS will allow the facilities team to react swiftly to comfort concerns without having to be on site. Furthermore, by optimizing controls throughout the district, Ecosystem will minimize the district's need to bring in outside controls contractors.

Equipment Installed	Useful Life
New Control Points	18 years

GT

MEASURE 8

Computer Energy Manager

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$7,071.00	0	53,375.72	0	$0.00	$7,071.00	$0.00	$11,318.84	1.6
R.M. Finley MS	$5,589.00	0	42,186.47	0	$5,000.00	$10,589.00	$0.00	$8,946.06	0.8
Connolly ES	$1,350.59	0	9,525.98	0	$0.00	$1,350.59	$0.00	$2,020.08	1.5
Deasy ES	$1,220.00	0	9,677.18	0	$0.00	$1,220.00	$0.00	$2,052.14	1.7
Gribbin ES	$1,393.46	0	9,828.39	0	$0.00	$1,393.46	$0.00	$2,084.21	1.5
Landing ES	$1,500.64	0	10,584.42	0	$0.00	$1,500.64	$0.00	$2,244.53	1.5
Admin/Thayer House	$273.00	0	2,168.00	0	$0.00	$273.00	$0.00	$641.29	2.3
Carriage House	$229.00	0	1,084.00	0	$0.00	$229.00	$0.00	$320.65	1.4
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$18,627**	**0**	**138,430**	**0**	**$5,000**	$23,627	**$0**	**$29,628**	**1.3**

Reason for Selection

Implementing this measure will give the district the ability to efficiently manage technology deployment and energy consumption. With long, continuous operating hours, the IT needs of the district cost thousands of dollars a year in electricity, but solutions like WakeSmart can both measure and reduce the power consumption, while also being able to inventory connected devices and provide the district's IT staff new controls to help keep computers up to date.

Scope

- Ecosystem will install WakeSmart, a computer energy management software, on 834 Windows computers and 90 Mac computers throughout Glen Cove School District.

	Windows Computers	Mac Computers
District Wide Count	834	90

Savings Justification

Based on surveys of the existing computers and their methods of operation, Ecosystem calculated the savings generated by this measure per computer. Detailed calculations can be found in the M&V report in the Appendix. Savings are expected to be above average, as district IT has informed Ecosystem that computers currently operate primarily in their high-power modes.

Operation and Maintenance

Computer energy managers like WakeSmart are a quick and easy way to generate savings with no impact to the learning environment. This measure, once implemented, can be maintained by the district's IT staff with minimal time needed. In addition, two years of maintenance are included in the price, which gives time for the district's staff to learn the ins and outs of the software before taking full ownership.

WakeSmart is purchased as a perpetual license meaning there are no annual fees or subscription costs. Licenses can be transferred to new computers as the district replaces existing ones without any additional cost. As such, the lifespan of this measure is said to be 20 years. The WakeSmart software will be hosted on a cloud-based server for the first two years of the project, after which time the district will transition it over and host it on their own servers. This will not cause the district to incur additional costs and will not impact the savings generated by the measure.

GT

MEASURE 9

Plug Load Manager

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$3,015.03	0	20,351.17	0	$0.00	$3,015.03	$0.00	$19,957.39	6.6
R.M. Finley MS	$3,116.00	0	23,052.99	0	$0.00	$3,116.00	$0.00	$18,253.71	5.9
Connolly ES	$1,986.84	0	13,411.03	0	$0.00	$1,986.84	$0.00	$10,465.46	5.3
Deasy ES	$2,406.00	0	17,763.75	0	$0.00	$2,406.00	$0.00	$10,465.46	4.3
Gribbin ES	$2,057.48	0	13,687.84	0	$0.00	$2,057.48	$0.00	$11,682.37	5.7
Landing ES	$2,117.05	0	14,813.16	0	$0.00	$2,117.05	$0.00	$8,518.40	4.0
Admin/Thayer House	$293.00	0	2,165.00	0	$0.00	$293.00	$0.00	$1,460.30	5.0
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$126.00	0	917.00	0	$0.00	$126.00	$0.00	$486.77	3.9
Total	**$15,117**	**0**	**106,362**	**0**	**$0**	**$15,117**	**$0**	**$81,290**	**5.4**

Reason for Selection

Plug load managers provides the district with remote, centralized control over a variety of devices and their energy consumption. Ecosystem engineers noticed devices like projectors being left on after school had ended and buildings were unoccupied. This measure will automatically shut down devices when they don't need to be on.

Scope

- Ecosystem will install 334 BERT Brain plug load managers on devices throughout the district.
- Ecosystem will establish schedules and policies for controlled devices to ensure they operate only when needed.

CT

	High School	Middle School	Connolly ES	Deasy ES	Gribbin ES	Landing ES	Thayer, Carriage, & Garage	Total
Projector	29	39	17	10	17	11	0	123
Med. Printer	36	15	10	7	11	4	3	86
Charging Cart	0	0	4	7	7	6	0	24
Smartboard	1	0	0	0	1	0	0	2
Proj/SmBrd Combo	0	2	0	2	0	0	0	4
AC-110 15A	12	10	11	13	9	12	4	71
AC-220 20A	0	6	0	3	0	0	0	9
Copier- 110 15A	2	2	1	1	2	2	1	11
H/C Water	0	0	0	0	1	0	0	1
Soda Vend.	1	1	0	0	0	0	0	2
Lrg. Coffee	1	0	0	0	0	0	0	1

Savings Justification

Plug load managers reduce energy consumption by eliminating parasitic loads and by allowing equipment to be remotely scheduled, preventing devices from being left on afterhours. Detailed savings calculations can be found in the M&V plan.

Operation and Maintenance

Plug load managers allow the district to create schedules and prevent devices from running when they are not needed. Plug load managers have built in software that ensures that devices like projectors power down before being shut off, ensuring that they are not damaged in the process. This measure is expected to have an 18-year lifespan.

GT

MEASURE 10

Envelope Improvements

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$3,601.08	0	0.00	467	$0.00	$3,601.08	$0.00	$55,960.66	15.5
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$1,696.66	0	0.00	179	$0.00	$1,696.66	$0.00	$20,359.16	12.0
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$3,206.49	0	0.00	332	$0.00	$3,206.49	$0.00	$27,556.34	8.6
Landing ES	$5,697.41	0	0.00	540	$0.00	$5,697.41	$0.00	$130,970.84	23.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$14,202**	**0**	**0**	**1,519**	**$0**	**$14,202**	**$0**	**$234,847**	**16.5**

Reason for Selection

Ecosystem will implement measures that improve insulation weak points in the building envelope. This minimizes unwanted air infiltration and reduces wasted energy, reducing utility costs, and enhancing student and staff comfort.

Scope

- Ecosystem will improve various aspects of the building envelopes at four schools in the district. Exact counts and measures can be found below. Detailed locations and specifications can be found in the report in the Appendix.

CT

Measure	Glen Cove High School	Connolly Elementary School	Gribbin Elementary School	Landing Elementary School	Total Quantity
Attic Bypass Air Sealing (SF)				9,147	9,147
Attic Flat Insulation (SF)				9,147	9,147
Buck Frame Air Sealing (LF)	125		498		623
Caulking (LF)				4,348	4,348
Construct Walkway (SF)				764	764
Door Weather Striping - Doubles (Units)	19	5	4	8	36
Door Weather Stripping - Singles (Units)	8	3	10	1	22
Install New Attic Hatch (Units)				1	1
Overhang Air Sealing (LF)	36				36
Overhang Air Sealing (SF)	172		60		232
Roof-Wall Intersection Air Sealing (LF)	1,024	678	566		2,268

Savings Justification

The savings generated by this measure come from increased thermal resistance and impermeability of the building envelope, which will reduce heat loss and air infiltration.

The calculation inputs that were used are as follows:

- The starting and ending R-values were used to calculate insulation savings, with the following equation: Btu/hr = U Value * Surface Area * ΔT
- The CFMs of air were estimated to calculate air infiltration savings, with the following equation: Btu/hr = 1.08 * CFM * ΔT
- For heating savings, the boiler efficiency was used.

Detailed calculation methods can be found in the M&V Plan.

Operation and Maintenance

This measure requires no new maintenance and has a lifespan of 20 years.

GT

MEASURE 11

Mechanical Insulation

Building	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Total Measure Cost	Simple Payback
Glen Cove HS	$1,175.36	0	0.00	145	$0.00	$1,175.36	$0.00	$23,671.87	20.1
R.M. Finley MS	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Connolly ES	$234.19	0	0.00	23	$0.00	$234.19	$0.00	$4,158.76	17.8
Deasy ES	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Gribbin ES	$1,130.52	0	0.00	98	$0.00	$1,130.52	$0.00	$12,503.31	11.1
Landing ES	$1,988.52	0	0.00	171	$0.00	$1,988.52	$0.00	$33,820.55	17.0
Admin/Thayer House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Carriage House	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Bus Garage / Shop	$0.00	0	0.00	0	$0.00	$0.00	$0.00	$0.00	-
Total	**$4,529**	**0**	**0**	**436**	**$0**	**$4,529**	**$0**	**$74,154**	**16.4**

Reason for Selection

Uninsulated pipes in the steam, condensate, and heating hot water systems are continuously very hot and are a good opportunity to generate energy savings while eliminating waste. These uninsulated parts of the heating system constantly radiate heat into the surroundings, overheating some spaces and wasting energy. Ecosystem will address areas with missing or underperforming insulation on pipes with a combination of insulation solutions (fiberglass and removable blankets). Areas where asbestos would need to be abated have not been included to maximize the financial benefits of this measure.

Scope

- Ecosystem will improve various aspects of the heating networks at four schools in the district. Exact counts and measures can be found below. Detailed locations and specifications can be found in the report in the Appendix.

Task	Glen Cove High School	Connolly Elementary School	Gribbin Elementary School	Landing Elementary School	Total Quantity
Ball Valve Insulation (Units)	4	1		2	7
Bonnet Insulation (Units)	3			10	13
Butterfly Valve Insulation (Units)			4		4
Check Valve Insulation (Units)	2		8		10
Control Valve Insulation (Units)	3			2	5
Flange Insulation (Units)	13		21	8	42
Gate Valve Insulation (Units)	5		2	4	11
Pipe Fitting Insulation (Units)	31	11	3	62	107
Pump Insulation (Units)	2		6	4	12
Steam Trap Insulation (Units)				6	6
Straight Pipe Insulation (LF)	121	32	9	162	324
Strainer Insulation (Units)			4	6	10
Tank Insulation (Units)				1	1
Triple Duty Valve Insulation (Units)			2		2

Savings Justification

Bare, uninsulated components of the distribution system lead to unnecessary distribution losses and wasted energy. Heat transfer calculations for both bare and under insulated sections were performed. Detailed calculation methods, equations, and assumptions can be found in the M&V Plan.

Operation and Maintenance

These measures require no new maintenance and have a lifespan of 20 to 25 years.

GT

Capital and Non-Capital CostsPer Building By Trade

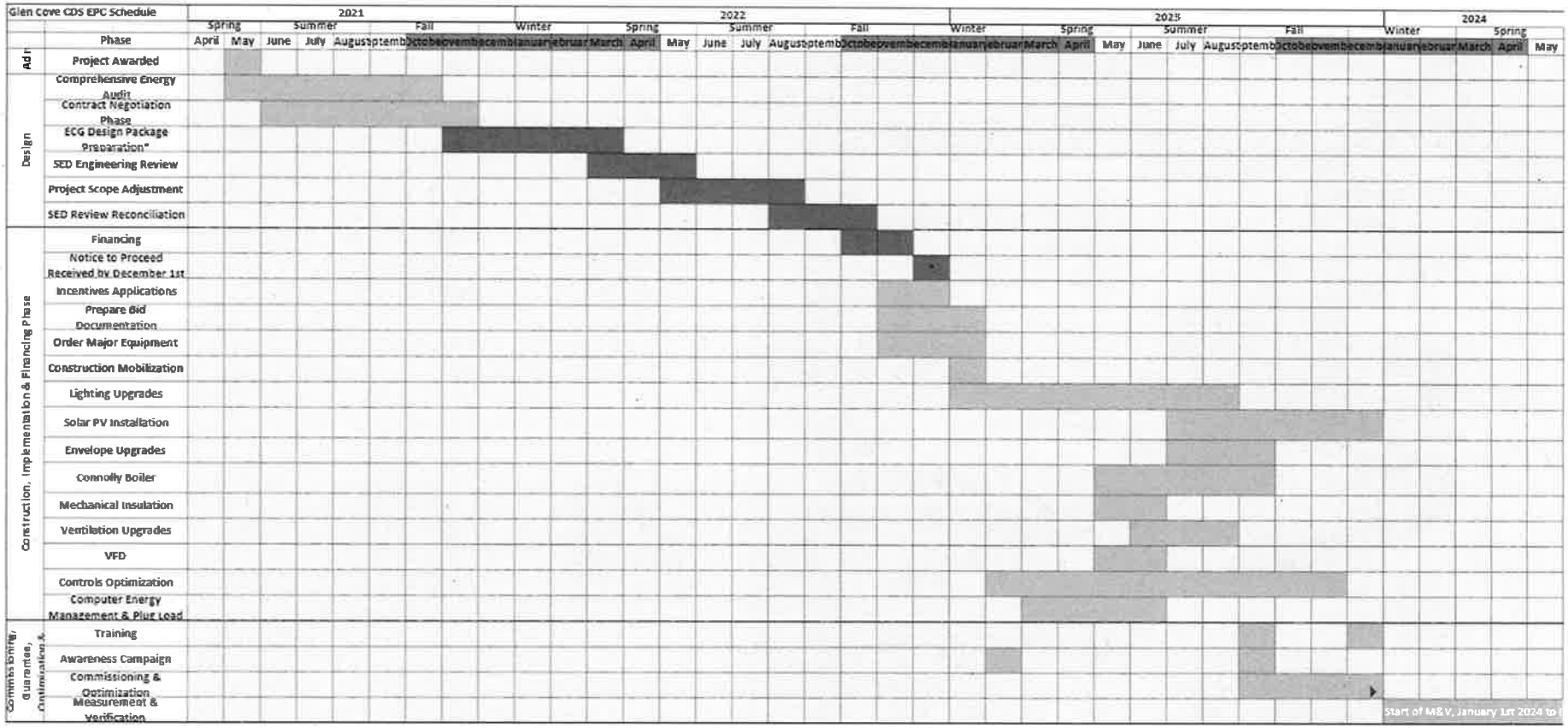
	Glen Cove HS		R.M. Finley MS		Connolly ES		Deasy ES		Gribbin ES	
Trade	Capital	Non-Capital	Capital	Non-Capital	Capital	Non-Capital	Capital	Non-Capital	Capital	Non-Capital
General	$ 708,948.34	$ -	$ 45,905.68	$ -	$ 31,882.90	$ -	$126,572.36	$ -	$218,602.79	$ -
HVAC	$ 468,583.33	$ -	$ -	$ -	$461,238.00	$ -	$ -	$ -	$ 17,282.11	$ -
Electrical	$1,817,391.89	$60,081.36	$503,284.90	$49,896.17	$271,206.39	$35,230.24	$236,022.14	$17,926.11	$481,563.77	$62,998.47
Plumbing	$ -	$ -	$ -	$ -	$ 89,819.84	$ -	$ -	$ -	$ -	$ -
Total	$ 2,994,924	$ 60,081	$ 549,191	$ 49,896	$ 854,147	$ 35,230	$ 362,594	$ 17,926	$ 717,449	$ 62,998

	Landing ES		Admin/Thayer House		Carriage House		Bus Garage / Shop	
Trade	Capital	Non-Capital	Capital	Non-Capital	Capital	Non-Capital	Capital	Non-Capital
General	$ 203,078.01	$ -	$ -	$ 1,292.59	$ -	$ 441.50	$ -	$ 1,185.36
HVAC	$ 33,820.55	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Electrical	$ 220,180.74	$25,105.13	$ -	$13,734.90	$ -	$ 4,294.17	$ -	$12,668.15
Plumbing	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total	$ 457,079	$ 25,105	$ -	$ 15,027	$ -	$ 4,736	$ -	$ 13,854

SCHEDULE

CT

Energy Performance Project Schedule



* Notice to proceed is required before continuing to construction mobilization. Any delay will result in a change of schedule.
SED Submission Package includes demo & construction drawings, sequences of operation, etc
Schedule will be adjusted based on SED approval and the financing of the project.

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ecosystem

ecosystem-energy.com

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EXHIBIT 5

REVISED M&V PLAN

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ecosystem
Energy Savings Experts

REVISED MEASUREMENT AND VERIFICATION PLAN

Glen Cove School District
Project No. 20SEE0003
Revision 1

Date: August 24, 2022

By: Hayden von Hoffmann

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Abbreviations

R^2	Coefficient of determination
CMVP	Certified Measurement and Verification Professional
CV [RMSE]	Coefficient of variation of the root-mean-square error
HDD	Heating degree days (based on a reference of 65°F)
CDD	Cooling degree days (based on a reference of 65°F)
ESCO	Energy service company
NEMVP	North American Energy Measurement and Verification Protocol
M&V	Measurement and verification
ECM	Energy conservation measure

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1. Facility Description

Glen Cove High School	
Surface area	195,300 sqft.
Sources of energy	Electric, Gas
Type of heating	Hot Water
Reference period	May 2020 – April 2021
Energy consumption of the reference period	963,000 kWh
Gas consumption of the reference period	126,536 therms

R. M. Finley Middle School	
Surface area	189,090 sqft.
Sources of energy	Electric, Gas
Type of heating	Steam
Reference period	May 2020 – April 2021
Energy consumption of the reference period	706,200 kWh
Gas consumption of the reference period	20,873 therms

Connolly Elementary School	
Surface area	41,859 sqft
Sources of energy	Electric, Gas
Type of heating	Forced Air
Reference period	May 2020 – April 2021
Energy consumption of the reference period	283,920 kWh
Gas consumption of the reference period	32,568 therms

Deasy Elementary School	
Surface area	42,040 sqft.
Sources of energy	Electric, Gas
Type of heating	Steam
Reference period	May 2020 – April 2021
Energy consumption of the reference period	140,680 kWh
Gas consumption of the reference period	4,461 therms

GT

Gribbin Elementary School	
Surface area	37,890 sqft.
Sources of energy	Electric, Gas
Type of heating	Hot Water
Reference period	May 2020 – April 2021
Energy consumption of the reference period	161,640 kWh
Gas consumption of the reference period	27,703 therms

Landing Elementary School	
Surface area	37,240 sqft.
Sources of energy	Electric, Gas
Type of heating	Steam
Reference period	May 2020 – April 2021
Energy consumption of the reference period	205,440 kWh
Gas consumption of the reference period	28,801 therms

Admin/Thayer House	
Surface area	8,115 sqft.
Sources of energy	Electric, Gas
Type of heating	Hot Water
Reference period	May 2020 – April 2021
Energy consumption of the reference period	39,504 kWh
Gas consumption of the reference period	3,521 therms

Carriage House	
Surface area	2,880 sqft.
Sources of energy	Electric, Gas
Type of heating	Hot Water
Reference period	May 2020 – April 2021
Energy consumption of the reference period	3,522 kWh
Gas consumption of the reference period	1,241 therms

CT

	Garage/Shop
Surface area	7,150 sqft.
Sources of energy	Electric, Gas
Type of heating	Hot Water
Reference period	May 2020 – April 2021
Energy consumption of the reference period	23,280 kWh
Gas consumption of the reference period	3,557 therms

CT

2. Measure Objectives

	MEASURES TARGETED BY THE PROTOCOL		
	Length of M&V Plan	36 months from the date agreed upon with the client	
	Description	Expected Result	Description of the ECM Implemented
Project	Solar PV	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Lighting Upgrades	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Boiler Upgrade	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	VFDs and Motor Replacement	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Ventilation Upgrade	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	BMS and Controls Upgrade	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Computer Energy Manager Installation	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Plug Load Manager Installation	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Envelope Improvements	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table
	Insulation Improvements	Refer to Comprehensive Energy Audit, measure metrics table	Refer to Comprehensive Energy Audit, measure metrics table

Annual Savings

Source of Energy	Energy Savings	Savings in MMBTU
Electricity	1,644,453 kWh	5,609
Natural gas	81,900 therms	8,190
Total		**13,799**

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3. Measuring Options and Boundaries

Table 1: Overview of M&V Options

M&V Option	How Savings Are Calculated	Typical Applications
A. Partially Measured Retrofit Isolation Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied, separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous. Partial measurement means that some but not all parameter(s) may be stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&V Plan along with analysis of the significance of the error they may introduce.	Engineering calculations using short term or continuous post-retrofit measurements and stipulations.	Lighting retrofit where power draw is measured periodically. Operating hours of the lights are assumed to be one half hour per day longer than store open hours.
B. Retrofit Isolation Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.	Engineering calculations using short term or continuous measurements	Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the baseyear this meter is in place for a week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use.
C. Whole Facility Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.	Analysis of whole facility utility meter or sub-meter data using techniques from simple comparison to regression analysis.	Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a twelve month baseyear period and throughout the post-retrofit period.
D. Calibrated Simulation Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation.	Energy use simulation, calibrated with hourly or monthly utility billing data and/or end-use metering.	Multifaceted energy management program affecting many systems in a building but where no baseyear data are available. Post-retrofit period energy use is measured by the gas and electric utility meters. Baseyear energy use is determined by simulation using a model calibrated by the post-retrofit period utility data.

Source: https://www.nrel.gov/docs/fy02osti/31505.pdf

For gas energy savings, Option C (whole facility) was selected to calculate the savings achieved per school because all systems affected by this project have a gas meter. The expected savings represent 21% of the total gas consumption. This is greater than the 10% minimum suggested by NEMVP Option C. Option C relies on the use of meters from energy suppliers to assess the overall energy performance of the facility. This method is used to calculate the total gas savings for the project. **It is imperative that Ecosystem has access to the monthly gas bills. Ecosystem will use these bills to verify the buildings are performing as our model expected.**

Electricity consumption is expected to decrease by 91%, with lighting and solar PV accounting for 76%. Electricity savings are attained by multiple measures that function independently of each other. Option A methodology shall be used to verify electricity savings for this project by taking point source data as described below and comparing it to the ECM energy model. Option A is a verification approach designed for projects where the potential to perform needs to be verified, but the actual performance (savings) can be calculated based on the results of the potential to perform and generate savings through engineering calculations. This methodology is best used to isolate energy savings from the EPC project from other ongoing capital work going on throughout the district.

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ECM #	Energy Conservation Measure	M & V Option	Energy Type Saved
ECM 1	Solar PV	A	Electricity
ECM 2	Lighting Upgrades	A	Electricity
ECM 3	Boiler Upgrade	C	Gas
ECM 4	VFDs and Motor Replacement	A	Electricity
ECM 5	Ventilation Upgrade	A & C	Electricity & Gas
ECM 6	BMS and Controls Upgrade	C	Gas
ECM 7	Computer Energy Manager Installation	A	Electricity
ECM 8	Plug Load Manager Installation	A	Electricity
ECM 9	Envelope Improvements	C	Gas
ECM 10	Insulation Improvements	C	Gas

3.1 Description of Option A Methodology Per Measure

3.1.1 Solar PV

Helioscope simulation for electricity production will be used to determine the electricity production.

3.1.2 Lighting Upgrade

Pre-retrofit lighting kW will be analyzed and listed in the lighting line by line by fixture type and location. The kW data from the line by line will be used for pre-retrofit savings calculation. Pre-kW will be sampled and measured to validate the line by line. A 10% sample for lighting fixture types that account for more than 10% of the total fixtures installed will be measured. This will be used to confirm the data from the line by line. The true RMS power will be taken at the light switch for the circuit that contains only the sampled fixtures.

A sample of pre- and post-retrofit light level measurements will be taken and compared to the recommended ASHRAE levels.

For fixtures where measurement isn't taken, the wattage of new fixtures will be taken from the lighting submittals for calculation purposes.

Formulas and hours of operation in the Appendices will be used to calculate the savings.

3.1.3 VFD Installation

Amperage measurements will be taken at full load and part load conditions to verify the savings model.

Formulas and hours of operation in the Appendices will be used to calculate the savings.

3.1.4 Ventilation Upgrade

Amperage measurements will be taken at full load and part load conditions to verify the savings model. Fresh air heating and cooling loads will be calculated based on room temperature set points during occupied times.

Formulas and hours of operation in the Appendices will be used to calculate the savings.

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3.1.5 Computer Energy Manager Installation

Ecosystem will verify that the software is still in use each year during the M&V period.

Formulas and hours of operation in the Appendices will be used to calculate the savings.

3.1.6 Plug Load Manager Installation

BERT Brain's reporting tools will be used to collect data of current energy usage of the devices.

Formulas and hours of operation in the Appendices will be used to calculate the savings.

For any measures, if there is a shortfall in savings in any one year during the period that M&V Services are provided and such shortfall is the result of the equipment not operating in accordance with specified criteria, then Ecosystem shall have the opportunity to conduct repairs or make adjustments to the equipment as necessary to resolve the cause of the shortfall. Once the cause of the shortfall is resolved, it shall be assumed (based upon the equipment continuing to operate in accordance with the specified criteria) that the savings will be met during each year of the Guarantee Period

4. Baseline: Period, Energy and Conditions

4.1 Baseline Peak Power and Consumption Amounts – Electricity and Gas

The baseline amounts in the table below were taken from PSEG Long Island and National Grid.

These tables list the baseline electricity real power (kW) and consumption (kWh) of the buildings. This data corresponds to May 2020 – April 2021.

Glen Cove High School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	32	234	96,900
February	28	243	88,800
March	28	229	92,100
April	31	290	103,800
May	33	268	61,800
June	28	280	50,100
July	31	196	66,900
August	33	274	88,200
September	28	316	73,500

GT

October	33	319	78,000
November	29	246	85,200
December	31	257	77,700
TOTAL	365	3,152	963,000

R.M. Finley Middle School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	30	178	65,400
February	28	196	63,000
March	31	173	56,400
April	30	170	64,200
May	33	259	31,800
June	28	271	31,200
July	31	308	51,600
August	33	266	88,800
September	28	326	61,200
October	31	322	69,000
November	31	181	62,400
December	31	173	61,200
TOTAL	365	2,822	706,200

Connolly Elementary School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	30	66	26,280

GT

February	30	72	31,200
March	30	72	20,760
April	33	72	34,920
May	34	50	21,480
June	34	61	21,480
July	28	71	23,040
August	29	61	17,520
September	30	66	18,840
October	34	64	20,880
November	29	65	25,320
December	27	72	22,200
TOTAL	368	790	283,920

Deasy Elementary School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	30	42	12,160
February	28	127	19,760
March	31	49	10,160
April	30	51	15,160
May	33	41	9,120
June	29	41	9,120
July	30	41	9,120
August	29	43	10,720
September	30	38	12,720
October	30	38	13,600
November	34	38	14,960
December	32	50	4,080
TOTAL	366	596	140,680

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Gribbin Elementary School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	30	54	34,200
February	29	49	7,740
March	28	54	11,160
April	33	40	9,180
May	30	40	9,000
June	30	49	9,000
July	31	49	10,260
August	31	49	9,540
September	31	60	17,820
October	31	54	17,280
November	30	49	12,780
December	31	49	13,680
TOTAL	365	594	161,640

Landing Elementary School			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	32	91	36,000
February	30	94	29,280
March	28	77	18,800
April	29	77	20,800
May	32	50	9,360
June	31	59	9,360
July	31	59	9,360
August	30	59	10,160
September	33	60	12,640

GT

October	28	51	12,240
November	31	68	18,080
December	29	61	19,360
TOTAL	364	803	205,440

Admin/Thayer House			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	30	15	3,348
February	24	14	3,864
March	31	13	3,108
April	30	21	4,356
May	33	18	2,832
June	29	16	2,820
July	30	19	3,780
August	35	18	3,384
September	26	15	3,324
October	31	15	3,036
November	31	20	4,320
December	35	17	1,332
TOTAL	365	199	39,504

Carriage House			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	33	-	109
February	24	-	84
March	31	-	85
April	30	-	256
May	33	-	233

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June	29	-	247
July	30	-	384
August	35	-	493
September	26	-	660
October	31	-	524
November	31	-	315
December	35	-	132
TOTAL	368	-	3,522

Garage/Shop			
Month	Days	Real Power (kW)	Baseline Real Consumption (kWh)
January	33	9	2,520
February	24	9	2,880
March	31	9	1,720
April	30	8	2,240
May	33	10	1,960
June	29	11	1,600
July	30	11	2,000
August	35	12	1,120
September	26	10	2,160
October	31	10	2,120
November	31	11	2,160
December	35	9	1,800
TOTAL	368	117	24,280

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These tables below present the natural gas consumption of the facilities. The data corresponds to May 2020 – April 2021 and the heating degree day data found in Section 4.2.

Glen Cove High School		
Month	Days	Natural Gas Consumption (therms)
January	32	27,277
February	29	27,917
March	29	20,349
April	32	9,128
May	35	5,008
June	24	673
July	33	577
August	30	682
September	29	487
October	31	1,352
November	30	12,402
December	36	20,683
TOTAL	370	126,536

R.M. Finley Middle School		
Month	Days	Natural Gas Consumption (therms)
January	32	4,628
February	29	4,932
March	29	3,033
April	32	1,189
May	35	403
June	24	52
July	33	41
August	30	40

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September	29	42
October	31	362
November	30	2,598
December	36	3,553
TOTAL	370	20,873

Connolly Elementary School		
Month	Days	Natural Gas Consumption (therms)
January	32	6,183
February	29	6,697
March	29	5,130
April	32	3,712
May	35	2,644
June	24	789
July	33	147
August	30	162
September	29	150
October	31	350
November	30	2,103
December	36	4,401
TOTAL	370	32,468

Deasy Elementary School		
Month	Days	Natural Gas Consumption (therms)
January	32	1,029
February	29	1,096

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March	29	674
April	32	264
May	35	90
June	24	11
July	33	9
August	30	9
September	29	9
October	31	81
November	30	578
December	36	790
TOTAL	370	4,641

Gribbin Elementary School		
Month	Days	Natural Gas Consumption (therms)
January	32	6,557
February	29	6,252
March	29	3,673
April	32	2,126
May	35	612
June	24	120
July	33	122
August	30	116
September	29	230
October	31	710
November	30	2,302
December	36	4,881
TOTAL	370	27,703

Landing Elementary School

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Month	Days	Natural Gas Consumption (therms)
January	32	7,970
February	29	7,759
March	29	4,229
April	32	2,269
May	35	685
June	24	46
July	33	35
August	30	34
September	29	38
October	31	76
November	30	2,069
December	36	3,592
TOTAL	370	28,802

Admin/Thayer House		
Month	Days	Natural Gas Consumption (therms)
January	32	704
February	29	600
March	29	544
April	32	421
May	35	284
June	24	7
July	33	4
August	30	4
September	29	4
October	31	105
November	30	380
December	36	463

CT

TOTAL	370	3,521

Carriage House		
Month	Days	Natural Gas Consumption (therms)
January	32	247
February	29	269
March	29	171
April	32	120
May	35	77
June	24	43
July	33	11
August	30	3
September	29	3
October	31	19
November	30	95
December	36	183
TOTAL	370	1,241

Garage/Shop		
Month	Days	Natural Gas Consumption (therms)
January	32	811
February	29	889
March	29	558
April	32	275
May	35	218
June	24	28
July	33	6
August	30	5

GT

September	29	6
October	31	11
November	30	323
December	36	426
TOTAL	370	3,557

CT

4.2 Independent Variables

Independent variables include factors that influence a building's energy consumption and will systematically be taken into account for ongoing adjustments to the reference year during the M&V period. The factor chosen for the buildings appears below. This is the factor that will be used for all buildings unless otherwise noted.

Outdoor temperature (heating and cooling degree days), based on a reference of 65°F, La Guardia weather station
Source: https://www.weather.gov/okx/LaGuardiaHistorical

2020 - 2021 Baseline Degree Days

Month	Heating Degree Days Compared to 65°F	Cooling Degree Days Compared to 65F°F
January 2021	954	-
February 2021	875	-
March 2021	662	2
April 2021	393	3
May 2020	260	20
June 2020	21	173
July 2020	-	387
August 2020	0	322
September 2020	42	144
October 2020	216	10
November 2020	394	4
December 2020	794	-
Total	4,612	1,066

During the M&V period, the same weather station and heating degree day reference temperature must be used. The following table summarizes the applicable variables and baseline references.

Source of Energy	Variables and Baseline References
Electricity consumption	Baseline degree days compared to 65°F
Natural gas consumption	Baseline degree days compared to 65°F

CT

4.3 Energy Consumption Static Factors

Static factors include equipment and modes of operation deemed fixed when the M&V plan was drawn up. No adjustment calculations are therefore planned for these factors in the M&V plan. However, adjustments may be required in the event of changes to these data and parameters. The following list shows certain events that may change static factors. This list is not exhaustive and could include any other change made to the building or its operations likely to affect energy requirements.

- Changes in how the building or part of the building is used
- Building repurposing
- Changes to the building's occupancy rate
- Building expansion
- Addition or removal of electromechanical equipment
- New standards or regulations for ambient conditions

Information on the state of the building before the project and on sections unaffected by the measures is also considered to be a static factor.

5. M&V Period

The length of the M&V period corresponds to the duration of the contract, which is 3 years.

6. Basis for Adjustments

Type of Savings	Equation
Energy Savings	Avoided energy consumption = Energy baseline (±) Periodic adjustments to M&V period conditions (±) Non-periodic adjustments to M&V period conditions (-) M&V period energy

7. Baseline Adjustment Methodology

7.1 Periodic Adjustments

For each natural gas, mathematical models can be used to adjust the baseline to account for relevant independent variables. The baseline for electricity usage will not require any periodic adjustments.

7.1.1 Natural Gas

Reference year data was used to determine the equation to use for adjustments due to the outdoor temperature. As natural gas is used primarily for heating and the production process, heating degree days have been used to determine the equation.

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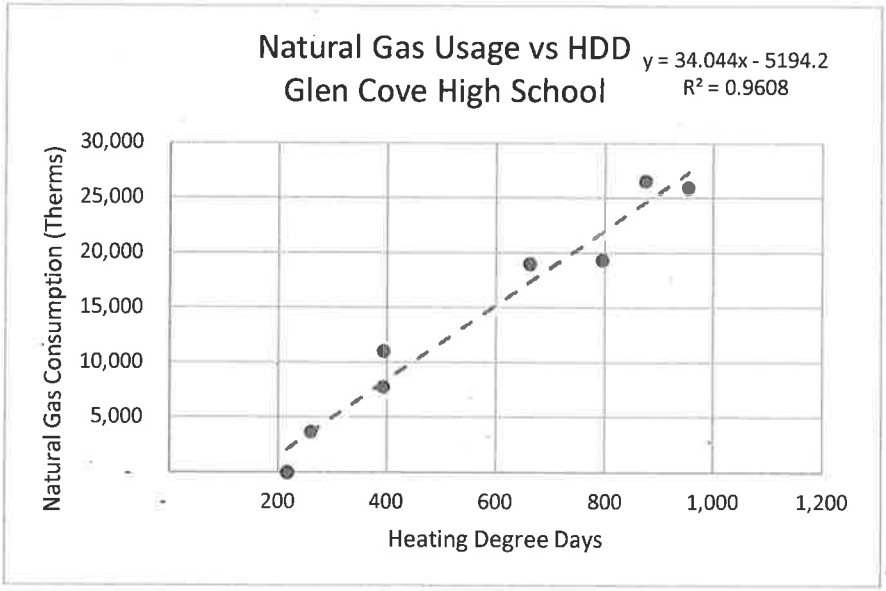
Glen Cove High School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	27,277	487	26,790	954
February	29	27,917	487	27,429	875
March	29	20,349	487	19,862	662
April	32	9,128	487	8,641	393
May	35	5,008	487	4,521	260
June	24	673	487	186	21
July	33	577	487	90	-
August	30	682	487	195	0
September	29	487	487	-	42
October	31	1,352	487	865	216
November	30	12,402	487	11,915	394
December	36	20,683	487	20,196	794
Total	370	126,536	5,845	120,691	4,612



Adjustment equation: y = 34.044x – 5194.2

Variance: R^2 =0.9608 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

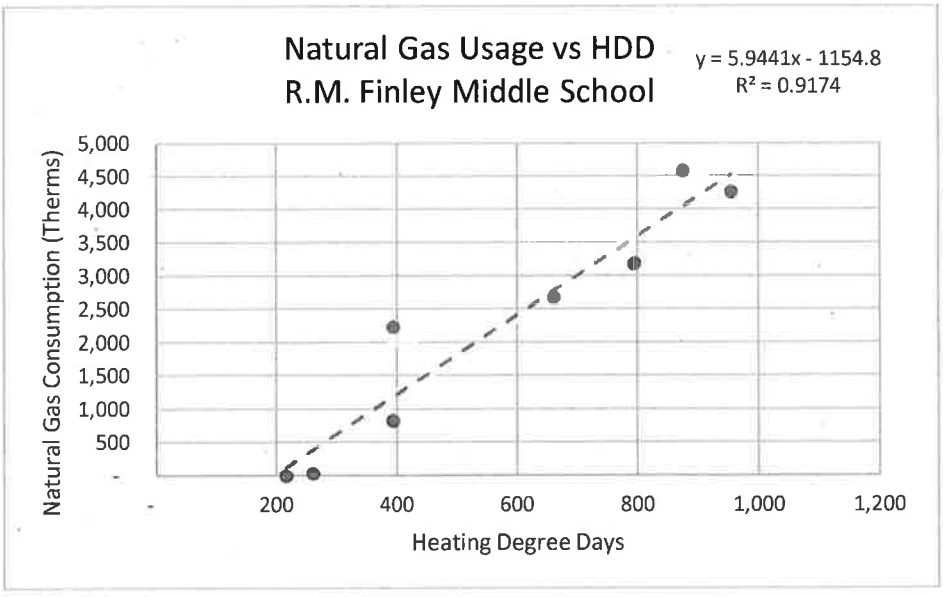
GT

x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Months adjusted to account for outdoor temperature: January to May and October to December

R. M. Finley Middle School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	4,628	40	4,588	954
February	29	4,932	40	4,892	875
March	29	3,033	40	2,993	662
April	32	1,189	40	1,149	393
May	35	403	40	363	260
June	24	52	40	11	21
July	33	41	40	1	-
August	30	40	40	-	0
September	29	42	40	2	42
October	31	362	40	322	216
November	30	2,598	40	2,558	394
December	36	3,553	40	3,513	794
Total	370	20,873	481	20,392	4,612



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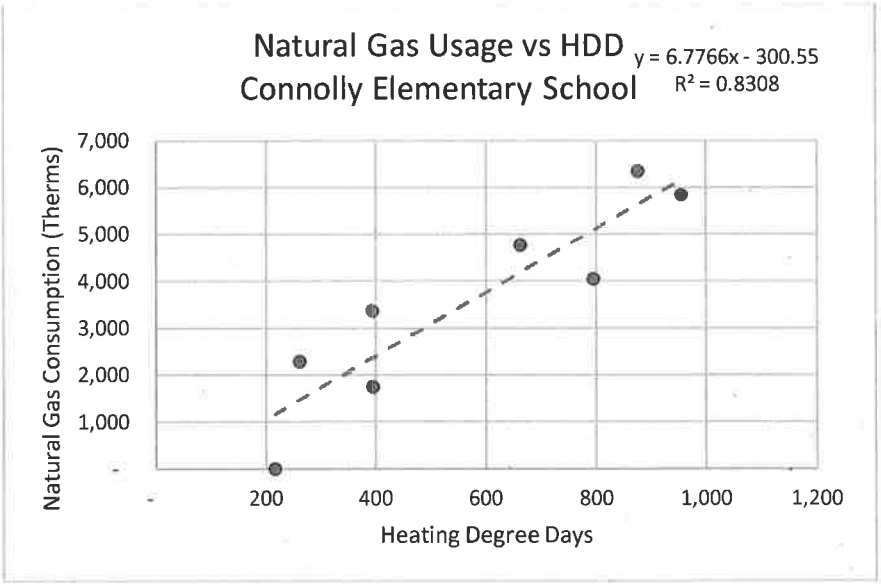
Adjustment equation: $y = 5.9441x - 1154.8$
Variance: $R^2 = 0.9174$ (0.75 to 1) is considered acceptable
Where
y = Monthly natural gas consumption (therms)
x = Monthly heating degree days based on 65°F
B = Monthly fixed consumption (therms)
Months adjusted to account for outdoor temperature: January to May and October to December

Connolly Elementary School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	6,183	147	6,036	954
February	29	6,697	147	6,550	875
March	29	5,130	147	4,983	662
April	32	3,712	147	3,565	393
May	35	2,644	147	2,496	260
June	24	789	147	642	21
July	33	147	147	-	-
August	30	162	147	15	0
September	29	150	147	3	42
October	31	350	147	203	216
November	30	2,103	147	1,956	394
December	36	4,401	147	4,254	794
Total	370	32,468	1,764	30,704	4,612

GT



Adjustment equation: y = 6.7766x – 300.55

Variance: R^2 =0.8308 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Months adjusted to account for outdoor temperature: January to May and October to December

Deasy Elementary School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	1,029	9	1,020	954
February	29	1,096	9	1,088	875
March	29	674	9	665	662
April	32	264	9	255	393
May	35	90	9	81	260
June	24	11	9	3	21
July	33	9	9	0	-
August	30	9	9	-	0
September	29	9	9	0	42
October	31	81	9	72	216

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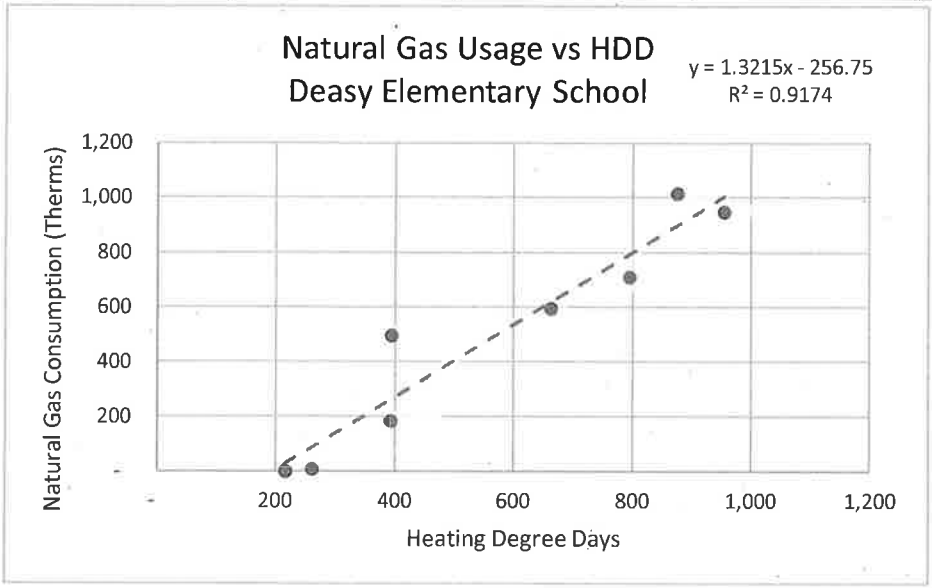
November	30	578	9	569	394
December	36	790	9	781	794
Total	370	4,641	107	4,534	4,612



Adjustment equation: y = 1.3215x – 256.75

Variance: R^2 =0.9174 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

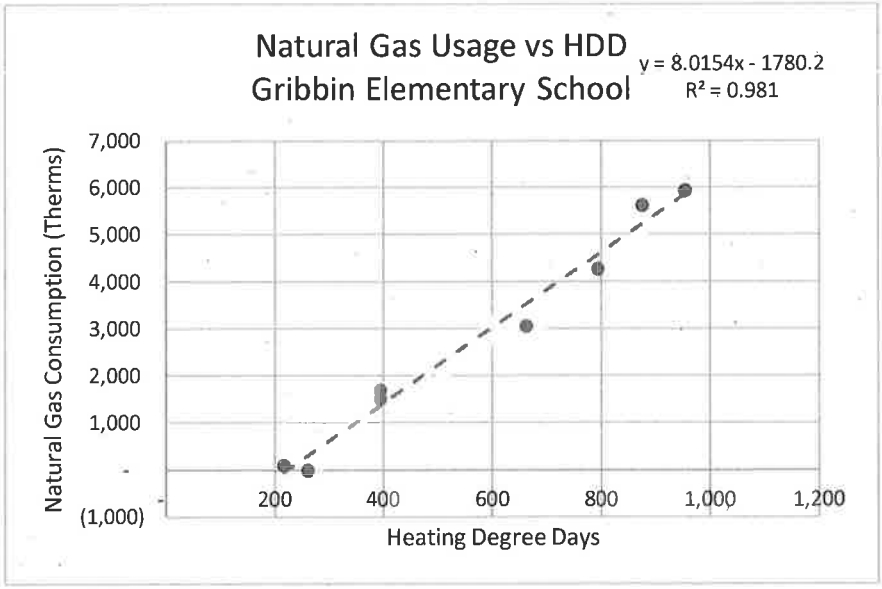
x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Months adjusted to account for outdoor temperature: January to May and October to December

GT

Gribbin Elementary School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	6,557	116	6,441	954
February	29	6,252	116	6,136	875
March	29	3,673	116	3,557	662
April	32	2,126	116	2,010	393
May	35	612	116	496	260
June	24	120	116	4	21
July	33	122	116	6	-
August	30	116	116	-	0
September	29	230	116	114	42
October	31	710	116	594	216
November	30	2,302	116	2,186	394
December	36	4,881	116	4,765	794
Total	370	27,703	1,392	26,310	4,612



Adjustment equation: y = 8.0154x – 1780.2

Variance: R^2 =0.981 (0.75 to 1) is considered acceptable

Where

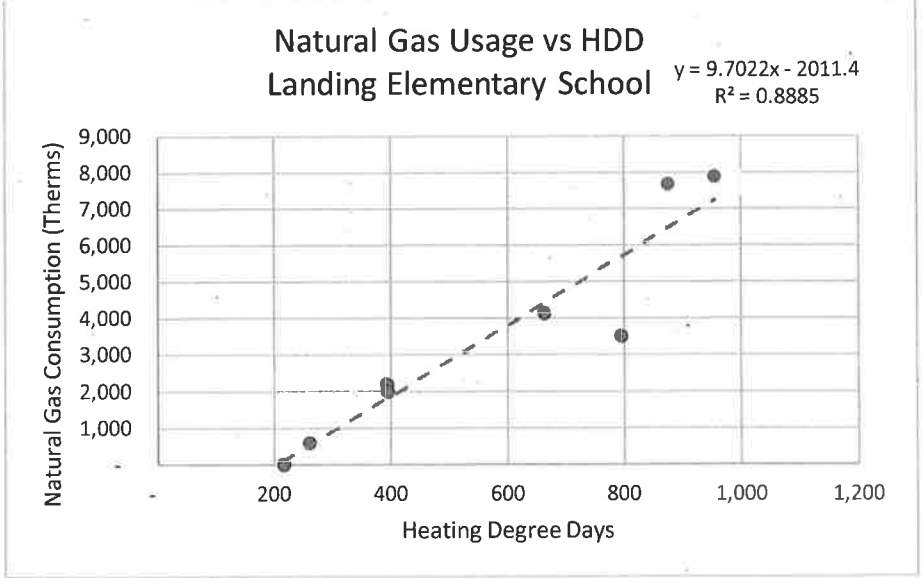
y = Monthly natural gas consumption (therms)

GT

x = Monthly heating degree days based on 65°F
B = Monthly fixed consumption (therms)
Months adjusted to account for outdoor temperature: January to May and October to December

Landing Elementary School					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	7,970	34	7,936	954
February	29	7,759	34	7,725	875
March	29	4,229	34	4,195	662
April	32	2,269	34	2,235	393
May	35	685	34	651	260
June	24	46	34	12	21
July	33	35	34	1	-
August	30	34	34	-	0
September	29	38	34	4	42
October	31	76	34	42	216
November	30	2,069	34	2,035	394
December	36	3,592	34	3,558	794
Total	370	28,802	408	28,394	4,612

GT



Adjustment equation: y = 9.7022x – 2011.4

Variance: R^2 =0.8885 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

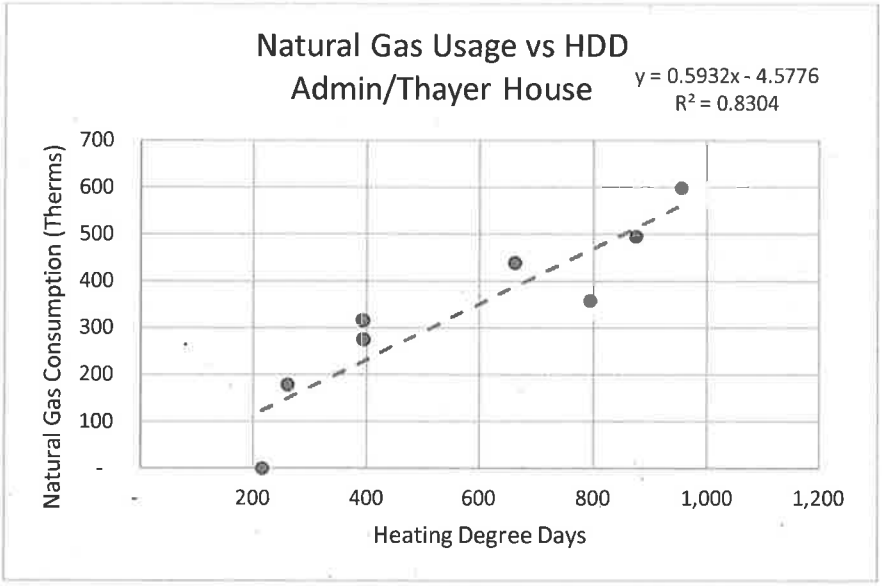
x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Admin/Thayer House					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	704	4	700	954
February	29	600	4	596	875
March	29	544	4	540	662
April	32	421	4	417	393
May	35	284	4	280	260
June	24	7	4	3	21
July	33	4	4	-	-
August	30	4	4	-	0
September	29	4	4	-	42
October	31	105	4	101	216
November	30	380	4	376	394
December	36	463	4	459	794

GT

Total	370	3,521	48	3,473	4,612



Adjustment equation: y = 0.5932x – 4.5776

Variance: R^2 =0.8304 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

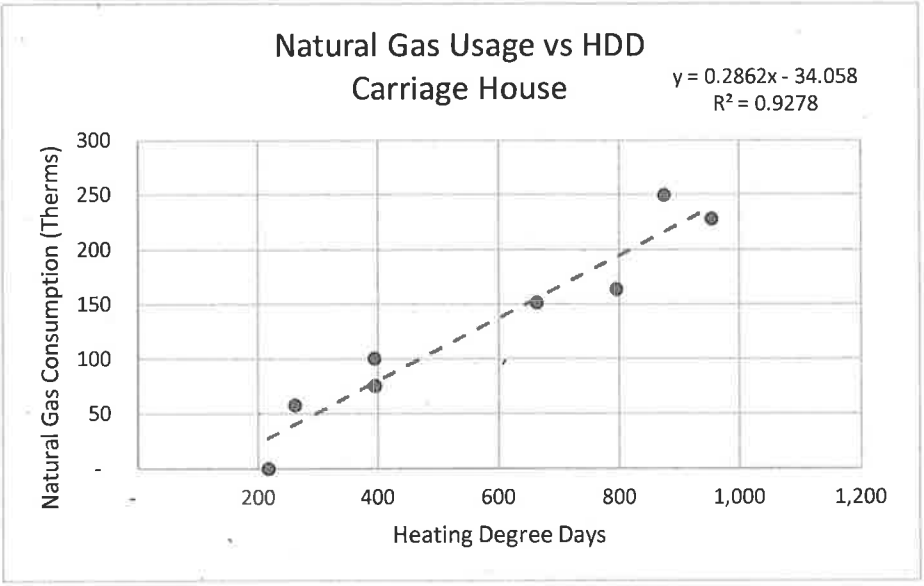
x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Carriage House					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	247	3	244	954
February	29	269	3	266	875
March	29	171	3	168	662
April	32	120	3	117	393
May	35	77	3	74	260
June	24	43	3	40	21
July	33	11	3	8	-
August	30	3	3	-	0
September	29	3	3	-	42
October	31	19	3	16	216

GT

November	30	95	3	92	394
December	36	183	3	180	794
Total	370	1,241	36	1,205	4,612



Adjustment equation: $y = 0.2862x - 34.058$

Variance: $R^2 = 0.9278$ (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

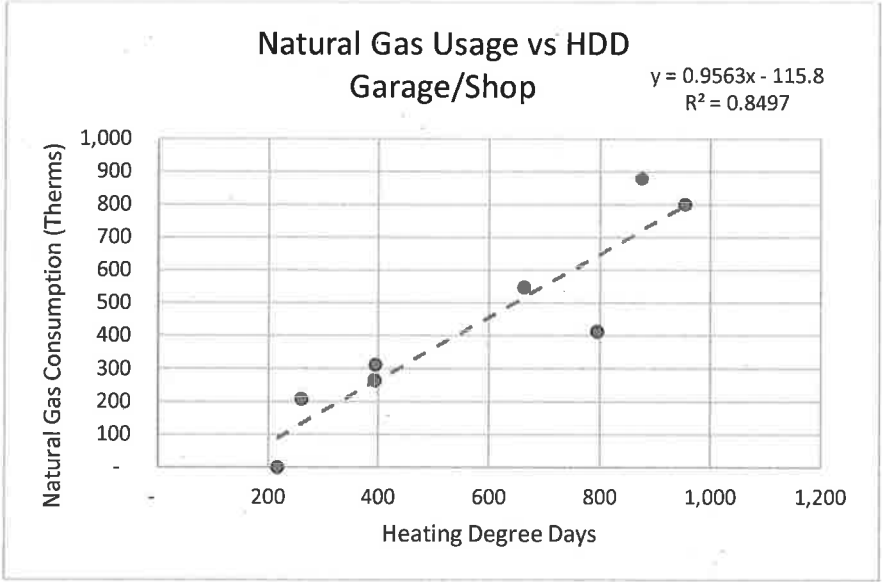
x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

Garage/Shop					
Month	Days	Natural Gas Consumption (therms)	DHW Consumption (Therms)	Consumption w/o DHW (Therms)	Heating Degree Days
January	32	811	5	806	954
February	29	889	5	884	875
March	29	558	5	553	662
April	32	275	5	270	393
May	35	218	5	213	260
June	24	28	5	23	21
July	33	6	5	1	-
August	30	5	5	-	0

GT

September	29	6	5	1	42
October	31	11	5	6	216
November	30	323	5	318	394
December	36	426	5	421	794
Total	370	3,557	60	3,496	4,612



Adjustment equation: y = 0.9563x – 115.8

Variance: R^2 =0.8497 (0.75 to 1) is considered acceptable

Where

y = Monthly natural gas consumption (therms)

x = Monthly heating degree days based on 65°F

B = Monthly fixed consumption (therms)

GT

7.2 Non-periodic Adjustments

Should equipment be added, removed, or turned off, data will be collected using change plans, specifications, equipment specifications, information from the manufacturer or a short-term measuring campaign. The best collection method will be determined according to the nature of changes to static factors. Operating hours for new equipment may be estimated depending on use. Arrangements will be approved by the client. It is important that Glen Cove keep Ecosystem aware of projects and changes that are happening within each school.

At the time of writing this report, Ecosystem has already identified events that will require non-periodic adjustments during the implementation and M&V stages. The district's project to extend Deasy Elementary School will require non-periodic adjustments based on the equipment that is installed in this building and their hours of use. Calculations will be done based on drawings provided by the district.

8. Energy Price Adjustments

Savings adjustments are calculated by applying the appropriate price scale in the following equation:

Savings adjustment = CR - CF

Where

CR = (Cost reference) price of energy, defined as the baseline peak power and energy consumption plus any periodic and non-periodic adjustments

CF = (Cost follow-up) price of energy from the M&V period plus or minus any adjustments

Cash savings should be determined by applying the same rates used to calculate the CR and CF, presented below.

Electricity:

The following utility rates will be used to calculate the cost of electricity before and after the project's implementation. The supply rates are determined based on the utility rates from the last two years to mitigate the cost variation.

The electric savings will be calculated with the applicable rate, which is the greater between:

- The current PSEG Long Island rates in effect during the follow-up year; or
- The floor price of $0.12 for electrical supply and the PSEG Long Island rates in place on July 1, 2022, indexed by 2% per year from July 1, 2022.

Natural Gas:

The natural gas savings will be calculated with the applicable rate which is the greater between:

- The natural gas supplier's current rate (supply, compression, transportation, and distribution) in effect during the follow-up year; or
- The floor price based on the average price during the detailed study, indexed by 2% per year from July 1, 2022. A table below provides the applicable floor price for each building for which thermal savings are being claimed. These rates are based on the average total cost per therm charged by the utility over the past two years.

Building	Price per Therm
Glen Cove High School	$0.86
R.M. Finley Middle School	$1.19

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Connolly Elementary School	$1.01
Deasy Elementary School	$1.19
Gribbin Elementary School	$1.03
Landing Elementary School	$0.99
Admin/Thayer House	$1.56
Carriage House	$2.32
Garage/Shop	$1.48

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Below are the utility accounts and rates for all buildings.

Glen Cove Electrical Accounts and Rates		
Building	Account Number	Rate
Glen Cove High School	5835953950	Rate 285 (2022)
R.M. Finley Middle School	5835817950	Rate 285 (2022)
Connolly Elementary School	5834749000	Rate 281 (2022)
Deasy Elementary School	5835818500	Rate 281 (2022)
Gribbin Elementary School	5835740071	Rate 281 (2022)
Landing Elementary School	5837457000	Rate 281 (2022)
Admin/Thayer House	5835953200	Rate 281 (2022)
Carriage House	5835969921	Rate 280 (2022)
Garage/Shop	5835969901	Rate 281 (2022)

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Glen Cove Natural Gas Accounts and Rates	
Building	Account Number
Glen Cove High School	0175756000
	0278244009
	8786597008
R.M. Finley Middle School	6291254009
	7538044000
	8989204004
Connolly Elementary School	4003239007
	684211003
Deasy Elementary School	6291254009
	7538044000
	8989204004
Gribbin Elementary School	0775312000
	2757278007
Landing Elementary School	5249431002
	8129197000
Admin/Thayer House	2660606004
Carriage House	1415765008
Garage/Shop	3908047006

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9. Meter Features

For Method A and C, the following meters are used to measure the consumption and the building's total energy load:

- Electricity: PSEG LI meters
- Natural gas: National Grid meters

10. Distribution of M&V Responsibilities

Responsible Party	Energy Data Recording		Independent Variables		Static Factors	
	Data	Frequency	Data	Frequency	Data	Frequency
Glen Cove SD	PSEG LI bills	Bills must be sent to Ecosystem within two days.	N/A	N/A	Changes to hours of operation Equipment added/removed/turned off anywhere in the building Changes to equipment hours of operation	Once a month Added: 5 days after Removed: 5 days before Turned off: once a month
	National Grid bills	Bills must be sent to Ecosystem within two days.	N/A	N/A		
Ecosystem	N/A	N/A	Retrieve Heating Degree Day Data	Monthly		

Note: Ecosystem expects to obtain access to the online utility accounts for the duration of the M&V period in order to better collect data from the utilities. Ecosystem will use these bills to verify the buildings are performing as our model expected.

11. Report Responsibilities

Party Responsible	Ecosystem
Frequency	Annual
Delivery Date	60 days after receipt of last utility bills

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12. Budget

	Instrumentation	Surveys/Analyses/Report
Reference Period	-	Included in the project cost
M&V Period	-	Included in the project cost
Total	-	**Included in the project cost**

13. Report Format

Project name
Date
Building consumption
List of National Grid bills
Standardized natural gas building consumption
Adjustment factors

- Ongoing
- Non-periodical
- Periodical

Readjusted reference year calculation
Energy savings calculations (kW, kWh, therms, $)
Monthly savings since project start

14. Appendices

Please see the following section for M&V Plan Calculations and PSEG Rate Structure.

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1.888.ECOSYSTEM · www.ecosystem-energy.com

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EXHIBIT 6

REVISED M&V CALCULATIONS

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M&V CALCULATIONS (REVISED)

Savings Justification

Measure 1: Solar PV

All production data is taken from the helioscope model simulation. The following key parameters have been used in these simulations. For a detailed list of all parameters and models used, see the Helioscope reports found in the appendix of the CEA.

TMY, 10km grid (40.85,-73.65)

2% Soiling losses

0.5% AC System Derate

Savings were calculated using the existing PSEG rates in places as of 7/1/2021. 15% demand savings are claimed as this is inline with lower end of potential savings found using 15 minute data from previous projects.

Measure 2: Interior Lighting

Assumptions

Space	*Annual Hours of Operation*
Classroom	*2365*
Office	*2365*
Gym	*3390*
Auditorium	*2730*
Hallway	*3950*
General	*2290*
Storage	*2070*

**Bathrooms that had an occupancy sensor installed are assumed to have 1000 annual operating post retrofit.*

School Year Diversity Factor	*0.9*
Summer Diversity Factor	*0.5*

Technology	*Ballast Factor*
Fluorescent T8	*0.88*
Fluorescent T5	*0.95*
Fluorescent T12	*1*
CFL/Incandescent	*1*
HID	*1.15*

Interior Lighting

(1) kWh Savings

$$kW\ of\ a\ Old\ Lighting = \frac{W\ of\ Bulb}{1000} * (Ballast\ Factor) * \frac{Number\ of\ Bulbs}{Fixture} * \frac{Fixtures}{Space}$$

$$kW\ of\ New\ Lighting = \frac{W\ of\ Fixture}{1000} * \frac{Fixtures}{Space}$$

$$kWh\ Savings = \sum\{(kW\ of\ Old\ Lighting - kW\ of\ New\ Lighting) * (Annual\ Space\ Run\ Hours)\}$$

(2) kW Savings

$$kW\ Savings = \left(\sum kW\ of\ Old\ Lighting - \sum kW\ of\ New\ Lighting\right) * (Diversity\ Factor)$$

Measure 3 : Exterior Lighting

Assumptions

Space	*Annual Hours of Operation*
Exterior	*4380*

School Year Diversity Factor	*0.9*
Summer Diversity Factor	*0.5*

Technology	*Ballast Factor*
HID	*1.15*

Exterior Lighting

(1) kWh Savings

$$kW\ of\ a\ Old\ Lighting = \frac{W\ of\ Bulb}{1000} * (Ballast\ Factor) * \frac{Number\ of\ Bulbs}{Fixture} * \frac{Fixtures}{Space}$$

$$kW\ of\ New\ Lighting = \frac{W\ of\ Fixture}{1000} * \frac{Fixtures}{Space}$$

$$kWh\ Savings = \sum\{(kW\ of\ Old\ Lighting - kW\ of\ New\ Lighting) * (Annual\ Exterior\ Run\ Hours)\}$$

GT

Measure 4: Boiler Upgrades

Assumptions:

Existing hot air furnace efficiency = 80%

New condensing hot water boiler efficiency = 92.5%

Measure 5: VFDs and Motors

Assumptions:

- Fan affinity laws: $HP_{new} = HP_{old} * \left(\frac{RPM_{new}}{RPM_{old}}\right)^3$

Measure 6: Ventilation Upgrades

High School TV Studio RTU

$$kWh\ Savings = Runtime\ hours * ((\sum kW_{old\ compressors}) - kW_{new\ compressor})$$

High School Auditorium RTU

$$Auditorium\ Load\ [mmBTU] = \frac{1.08\ *\ 10{,}000\ CFM\ *\ HDD}{1{,}000{,}000 \frac{BTU}{mmBTU}}$$

$$Heat\ Pump\ Usage\ [kWh] = \frac{Auditorium\ Load}{EER_{unit} * 1000 \frac{Wh}{kWh}}$$

Measure 7: BMS and Controls

$$Connolly\ Fresh\ Air\ Savings\ [mmBTU] = \frac{Energy_{new}}{Energy_{existing}} = \frac{1.08 * CFM * (T_{sp,night} - T_{Space})}{1.08 * CFM * (T_{sp,day} - T_{outdoor})}$$

Measure 8: Computer Energy Manager

Unoccupied Hours: 6600 hours at all schools, 5600 at all administrative buildings

Desktop Computer kWh Savings

$$= (\#\ of\ Units) * (Unocc.\ hrs) * \frac{Active\ wattage - inactive\ wattage}{1000} * ((\%\ Unocc.\ hrs\ ative) + (1 - \%\ Unocc.\ hrs\ ative) * \%\ left\ on)$$

Measure 9: Plug Load Managers

Unoccupied Hours used for scheduling:

- *6800 hours for all devices other than AC units*
- *1800 hours for all AC units*

Scheduling Savings

$$= (\#\ of\ Units) * \frac{(Active\ Wattage)}{1000} * (Unocc.\ hrs) * (\%\ left\ on + \%\ Unocc.\ hrs\ ative)$$

Parasitic Load Savings

GT

For parasitic load hours, please see the audit included in the appendix of the CEA

$$= (\#\ of\ Units) * \frac{(Inactive\ Wattage)}{1000} * (Scheduled\ Off\ Hours)$$

PSEG Rate Structure

Please see the following pages.

GT

EXHIBIT 7

Attachment 5
Revised Project Financials
(Cash Flow Statement)

GT

Project Financial Summary

Measure	Energy Savings	Electrical Demand Savings (kW)	Electrical Savings (kWh)	Natural Gas Savings (MMBTU)	O&M Savings	Total Savings	Incentives	Contsruction Cost	EPC Project Management	Overhead and Profit	Architect Cost	Total Measure Cost	Simple Payback
1 Solar PV	$129,043.93	0.0	824,837.91	0.0	$0.00	$129,043.93	$0.00	$1,386,301.30	$126,027.39	$202,329.69	$85,732.92	$1,800,391.30	14.0
2 Interior Lighting Upgrades	$84,035.73	1520	410,577.01	0.0	$30,324.00	$114,359.73	$21,100.00	$1,562,075.10	$142,006.83	$227,983.75	$96,603.28	$2,028,668.96	17.6
3 Exterior Lighting Upgrades	$16,252.77	0.0	114,977.22	0.0	$722.50	$16,975.27	$0.00	$78,888.41	$7,171.67	$11,513.71	$4,878.69	$102,452.48	6.0
4 Boiler/Burner Upgrade/Replacement	$11,682.00	0.0	0.00	1,436.9	$7,877.50	$19,559.50	$0.00	$461,075.16	$41,915.92	$67,293.59	$28,514.23	$598,798.91	30.6
5 VFDs and Motor Replacement	$18,955.83	0.0	128,037.46	0.0	$0.00	$18,955.83	$0.00	$128,337.30	$11,667.03	$18,730.74	$7,936.75	$166,671.81	8.8
6 Air Handling Unit Upgrade/Replacement	$106.52	0.0	-28,167.27	469.2	$0.00	$106.52	$0.00	$408,423.35	$37,129.40	$59,609.10	$25,258.09	$530,419.94	4979.3
7 BMS & Controls Upgrade	$36,793.87	0.0	0.00	4,328.9	$12,390.10	$49,183.97	$0.00	$441,144.82	$40,104.07	$64,384.77	$27,281.68	$572,915.35	11.6
8 Computer Energy Manager	$18,626.70	0.0	138,430.16	0.0	$5,000.00	$23,626.70	$0.00	$22,813.40	$2,073.95	$3,329.60	$1,410.85	$29,627.80	1.3
9 Plug Load Managers	$15,117.40	0.0	106,361.94	0.0	$0.00	$15,117.40	$0.00	$62,593.18	$5,690.29	$9,135.43	$3,870.95	$81,289.85	5.4
10 Envelope Improvements	$14,201.63	0.0	0.00	1,518.7	$0.00	$14,201.63	$0.00	$180,832.19	$16,439.29	$26,392.33	$11,183.19	$234,847.00	16.5
11 Insulation Improvement	$4,528.59	0.0	0.00	436.2	$0.00	$4,528.59	$0.00	$57,098.95	$5,190.81	$8,333.55	$3,531.17	$74,154.48	16.4
Total	**$349,345**	**1,520**	**1,695,054**	**8,190**	**$56,314**	**$405,659**	**$21,100**	**$4,789,583**	**$435,417**	**$699,036**	**$296,202**	**$6,220,238**	15.28

Total Project Cost	$6,220,238
Total Incentives	$21,100
Yearly Savings	$405,659
Total Savings and Incentives	$7,322,963
Simple Payback	15.28

GHG	tonnes CO_2
Before	2710.4
After	1345.9
Savings	1364.5
Savings (%)	50%

GHG Equivalent	
Cars	Homes
294	156

Glen Cove City School District | Energy Performance Project Cash Flow

Total Project Cost	$ 6,220,238	**Annual Energy Savings**	$ 349,345	**Discount Rate**	3.25%
Amount non aidable	$ 284,854	**Annual O&M Savings**	$ 56,314	**Loan Interest Rate** (approx)	3.50%
Guaranteed Incentives	$ 21,100	**Annual Cost of Ongoing Services**	$ -	**Energy Inflation Rate**	2.00%
Net Project Investment	$ 6,199,138	**Net Project Savings**	$ 405,659	**Loan Term in Years**	15

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	Construction Year									
	Savings %									
	0%									
Annual Energy Cost without Improvements	$695,695	$709,609	$723,801	$738,277	$753,043	$768,104	$783,466	$799,135	$815,118	$831,420
Annual Energy Cost with Improvements	$695,695	$360,264	$367,470	$374,819	$382,315	$389,962	$397,761	$405,716	$413,830	$422,107
Annual Energy Cost Savings	$0	$349,345	$356,332	$363,459	$370,728	$378,142	$385,705	$393,419	$401,288	$409,313
Guaranteed Incentives		$21,100								
Annual O&M Savings	$0	$56,314	$57,440	$58,589	$59,761	$60,956	$62,175	$63,419	$64,687	$65,981
Payment for Financing Project - *Principal*	$0	($333,647)	($345,325)	($357,411)	($369,920)	($382,868)	($396,268)	($410,137)	($424,492)	($439,349)
Payment for Financing Project - *Interest*	$0	($225,328)	($213,650)	($201,564)	($189,055)	($176,108)	($162,707)	($148,838)	($134,483)	($119,626)
Payment for Ongoing Services	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Annual Benefits without State Aid	$0	($132,216)	($145,203)	($136,927)	($128,486)	($119,877)	($111,095)	($102,137)	($93,000)	($83,681)
State Financial assistance - *Principal*	$0	$103,322	$105,259	$107,233	$109,243	$111,292	$113,378	$115,504	$117,670	$119,876
State Financial assistance - *Interest*	$0	$33,201	$31,264	$29,290	$27,280	$25,232	$23,145	$21,019	$18,853	$16,647
Net Annual Benefits with State Aid	$0	$4,307	($8,680)	($404)	$8,037	$16,647	$25,429	$34,386	$43,523	$52,842
Cumulative Cash Flow with State Aid	$0	$4,307	($4,372)	($4,777)	$3,260	$19,907	$45,335	$79,721	$123,244	$176,087
Net Present Value of Cumulative Cash Flow	$0	$4,172	($3,970)	($4,337)	$2,734	$16,921	$37,909	$65,398	$99,095	$138,720

Project NPV 18 Years	$	1,456,429
Project Simple Payback (Years)		15.28
Project Payback with State Aid (Years)		16.04

Glen Cove Contract Version 2.0 January 11, 2023

NYSED Capital Building Aid Rate	30.70%
NYSED Nominal Interest Rate	1.875%
NYSED Amortized Amount	$ 5,914,284
NYSED Aid Payment Period (yrs)	**15**

2034	2035	2036	2037	2038	2039	2040	2041	2042		Total
$848,049	$865,010	$882,310	$899,956	$917,955	$936,314	$955,041	$974,141	$993,624	$	**15,194,376**
$430,549	$439,160	$447,943	$456,902	$466,040	$475,361	$484,868	$494,566	$504,457	$	**7,714,092**
$417,500	$425,850	$434,367	$443,054	$451,915	$460,953	$470,172	$479,576	$489,167	$	**7,480,284**
									$	**21,100**
$67,301	$68,647	$70,020	$71,420	$72,848	$74,305	$75,791	$77,307	$78,853	$	**1,205,815**
($454,727)	($470,642)	($487,115)	($504,164)	($521,809)	($540,073)	$0	$0	$0	$	**(6,437,946)**
($104,249)	($88,333)	($71,861)	($54,812)	($37,166)	($18,903)	$0	$0	$0	$	**(1,946,681)**
$0	$0	$0	$0	$0	$0	$0	$0	$0	$	-
($74,175)	($64,479)	($54,589)	($44,501)	($34,212)	($23,717)	$545,964	$556,883	$568,021	$	**322,572**
$122,124	$124,414	$126,747	$129,123	$131,544	$134,011	$0	$0	$0	$	**1,770,740**
$14,399	$12,109	$9,777	$7,400	$4,979	$2,513	$0	$0	$0	$	**277,109**
$62,348	$72,044	$81,934	$92,022	$102,311	$112,807	$545,964	$556,883	$568,021	$	**2,370,420**
$238,435	$310,479	$392,413	$484,435	$586,746	$699,553	$1,245,517	$1,802,400	$2,370,420	$	**2,370,420**
$184,002	$234,679	$290,498	$351,217	$416,599	$486,420	$813,703	$1,137,023	$1,456,429	$	**1,456,429**

ecosystem

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