Response to Request for Proposals for Energy / Operating Cost Reduction Program per the terms of the Pennsylvania Guaranteed Energy Savings Act (GESA) for

Lower Merion Township

Mike Bayesa, Account Executive
MBayesa@ESG.email
November 30, 2018
ELECTRONIC COPY
November 30, 2018

Ernie McNeely, Township Manager  
Lower Merion Township  
75 East Lancaster Avenue  
Ardmore, PA 19003

Subject: Response to Request for Proposals for Energy Efficiency Related Facilities Improvements per the Terms of the Pennsylvania Guaranteed Energy Savings Act for Lower Merion Township

Dear Selection Committee Members:

Energy Systems Group, LLC, (ESG) is pleased to provide its response to the above referenced Energy Performance Project. As a comprehensive and NAESCO accredited Energy Service Provider, ESG designs, develops, implements, operates, maintains and verifies innovative, customer focused energy and operation solutions that enhance our client partners’ facilities, productivity, comfort and finances so they can focus on meeting their core missions. ESG possesses all of the resources necessary to implement an energy performance contract project with the township.

The ESG team offers a complete complement of staff members to develop and implement comprehensive energy efficiency and guaranteed savings programs to assist various agencies in achieving mandated reductions in energy consumption. To ensure the strongest value and responsiveness, subcontractors, such as mechanical, lighting and water conservation specialists, will be selected/bid for specific jobs.

ESG would like to take this time to acknowledge the following as required by the RFP:

1. The terms and conditions set forth in the proposal will remain in effect at a minimum for ninety (90) days from date of opening of the proposal.
2. Listed below are the names of the individuals to contact regarding our response, both the primary point of contact and the primary person authorized to negotiate and bind the company.

The primary point of contact for questions or notification regarding the submitted response is:  The primary person(s) authorized to bind the company and conduct contract negotiations:

Mike Bayesa, Account Executive  
Email: mbayesa@esg.email  
Phone: 717.836.9871  

Gregory F. Collins, President or  
Dan Shell, VP and General Counsel  
Phone: 812.471.5000 / Fax: 812.475.2544

Thank you for your consideration. We look forward to your acceptance of our proposal.

Sincerely,

[Signature]

Gregory F. Collins  
President
## Table of Contents

Section 1  Official Statement of ESCO  
Section 2  Executive Summary  
Section 3  ESCO Background & Qualification  
Section 4  Technical  
Section 5  Project Implementation  
Section 6  Financial Justification  

### APPENDIX

Appendix 1 – ESCO Financial Information  
Appendix 2 – Sample Contract  
Appendix 3 – Sample M & V Plan
Section 1: Official Statement of ESCO

The ESCO shall include a statement that the proposal is a firm offer for a minimum 90-day period from the proposal due date. The proposal shall also provide the following information: Name, Title, Address, and Telephone number of the individual(s) with authority to negotiate and contractually bind the ESCO and also who may be contacted during the period of proposal evaluation. The individual authorized to bind the ESCO must sign the statements.

6.1.1   Section 1A: Security Bond and Non-Collusion Affidavit

On the following pages, we have included our cover letter, a copy of our Security Bond, a copy of the Non-Collusion Affidavit as well as our Certificate of Insurance as requested by the RFP.

We have also provided copies of these documents immediately following this section.
November 30, 2018

Ernie McNeely, Township Manager
Lower Merion Township
75 East Lancaster Avenue
Ardmore, PA 19003

Subject: Response to Request for Proposals for Energy Efficiency Related Facilities Improvements per the Terms of the Pennsylvania Guaranteed Energy Savings Act for Lower Merion Township

Dear Selection Committee Members:

Energy Systems Group, LLC, (ESG) is pleased to provide its response to the above referenced Energy Performance Project. As a comprehensive and NAESCO accredited Energy Service Provider, ESG designs, develops, implements, operates, maintains and verifies innovative, customer focused energy and operation solutions that enhance our client partners’ facilities, productivity, comfort and finances so they can focus on meeting their core missions. ESG possesses all of the resources necessary to implement an energy performance contract project with the township.

The ESG team offers a complete complement of staff members to develop and implement comprehensive energy efficiency and guaranteed savings programs to assist various agencies in achieving mandated reductions in energy consumption. To ensure the strongest value and responsiveness, subcontractors, such as mechanical, lighting and water conservation specialists, will be selected/bid for specific jobs.

ESG would like to take this time to acknowledge the following as required by the RFP:

1. The terms and conditions set forth in the proposal will remain in effect at a minimum for ninety (90) days from date of opening of the proposal.
2. Listed below are the names of the individuals to contact regarding our response, both the primary point of contact and the primary person authorized to negotiate and bind the company.

The primary point of contact for questions or notification regarding the submitted response is:

Mike Bayesa, Account Executive
Email: mbayesa@esg.email
Phone: 717.836.9871

The primary person(s) authorized to bind the company and conduct contract negotiations:

Gregory F. Collins, President or
Dan Shell, VP and General Counsel
Phone: 812.471.5000 / Fax: 812.475.2544

Thank you for your consideration. We look forward to your acceptance of our proposal.

Sincerely,

[Signature]

Gregory F. Collins
President

energysystemsgroup.com

©2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 1 – Official Statement of ESCO | 2
Bid Bond

CONTRACTOR: (Name, legal status and address)
Energy Systems Group, LLC
9877 Eastgate Court
Nowburgh, IN 47630

SURETY: (Name, legal status and principal place of business)
Liberty Mutual Insurance Company
175 Berkeley Street
Boston, MA 02116
State of Inc: Massachusetts

OWNER: (Name, legal status and address)
Lower Merion Township
75 East Lancaster Avenue
Ardmore, PA 19003

BOND AMOUNT: Ten Percent of the Proposed Initial Investment (10%)

PROJECT: (Name, location or address, and Project number, if any)
Request for Proposals for Energy-Efficiency Related Facilities Improvements

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety’s consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor’s bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 00 day of November, 2018

(Witness) Kaylin Beery

(Principal) Gregory F. Collins, President
Liberty Mutual Insurance Company

(Surety) Julie Denman, Attorney-in-Fact

energysystemsgroup.com

©2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 1 – Official Statement of ESCO | 3
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for mortgage, note, issue, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees. To confirm the validity of this Power of Attorney call 610-932-0240 between 9:00 am and 4:30 pm EST on any business day.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That the Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Florida (hereinafter collectively called the "Company") pursuant to and by authority herein set forth, does hereby name, constitute and appoint,

Julie Dierman

of the city of: Ardmore Address of: Michigan for use and behalf of attorney-in-fact, with full power and authority hereby conferred to sign, execute and acknowledge the following surety bond:

Principal Name: Energy Systems Group, LLC

Obligee Name: Lower Merion Township

Surety Bond Number: 43682-Liberty-19-29

Project Description: Request for Proposals for Energy Efficiency Related Facilities Improvements

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereof the 27th day of June, 2017.

The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By:

David M. Conley, Assistant Secretary

STATE OF PENNSYLVANIA
COUNTY OF MONTGOMERY

On this 27th day of February, 2017 before me personally appeared David M. Conley, who acknowledged him to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purpose therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, these humnatures subscribed my name and affixed my seal as notary public at King of Prussia, Pennsylvania, on the day and year first written above.

COMMONWEALTH OF PENNSYLVANIA

Notary Public

My Commission Expires March 29, 2021

[Signature]

By: [Seal]

The Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Amendments of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company, which instruments are true in full force and effect as follows:

ARTICLE IV: OFFICERS – Section 12. Power of Attorney. Any officer or official of the Corporation authorized for that purpose in writing by the Chairman or President, and subject to such limitations as the Chairman or President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, acknowledge and deliver as surety any and all underwriting, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to bind them in the seal of the Corporation.

ARTICLE XIII: Execution of Contracts – Section 5. Surety Bonds and Undertakings. Any officer of the Corporation authorized for that purpose in writing by the Chairman or President, and subject to such limitations as the Chairman or President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, acknowledge and deliver as surety any and all underwriting, bonds, recognizances and other surety obligations. Such attorneys-in-fact shall be the sureties of the sureties of the Corporation to the extent of their respective powers of attorney, and shall have full power to bind the Corporation by their signature and execution of any such instruments and to which they execute the seal of the Corporation.

Certificate of Domiciliation: The President of the Company, acting pursuant to the By-laws of the Company, authorizes David M. Conley, Assistant Secretary, to appoint such attorneys-in-fact, as may be necessary to act on behalf of the Company to make, execute, acknowledge and deliver as surety any and all underwriting, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any officer secretary of the Company, when appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

1. Renee C. Llewellyn, the undersigned, Assistant Secretary, of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company, do hereby certify that the original power of attorney of which this is a true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of November, 2018.

By:

Renee C. Llewellyn, Assistant Secretary

energysystemsgroup.com

©2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 1 – Official Statement of ESCO | 4
State of  
County of Kent  } SS:

On November 9, 2018, before me, a Notary Public in and for said County and State, residing therein, duly commissioned and sworn, personally appeared

Julie Danman

known to me to be Attorney-in-Fact of Liberty Mutual Insurance Company

the corporation described in and that executed the within and foregoing instrument, and known to me to be the person who executed the said instrument in behalf of the said corporation, and be duly acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year stated in this certificate above.

My Commission Expires 7/6/2024

Marta Baker  Notary Public
November 09, 2018

Angie Rawlinson
Energy Systems Group, LLC
9877 Eastgate Court
Newburgh, IN 47630

Subject: Bid Bond

Principal: Energy Systems Group, LLC
Obligee: Lower Merion Township
Bond Description: Request for Proposals for Energy-Efficiency Related Facilities Improvements
Bid Amount: 10%
Bid Date: 11/30/2018
Bid Estimate: $5,000,000.00

Dear Angie:

In response to the request dated, 11/6/2018, I am pleased to enclose the above-referenced bond document that is based on the information we received with the request.

Prior to filing with Lower Merion Township the following items need to be completed:

1. Signed by authorized officer
2. Officer's name and title inserted below signature
3. Corporate seal affixed (if applicable)

As always, the bond document should be re-checked for accuracy before filing with Lower Merion Township. In the event that the estimated contract price increases more than 10% prior to the bid opening date, please notify our office of the revised amount.

If you have any questions, please feel free to contact me. Thank you for allowing Marsh to service your surety needs.

Sincerely,

Julie Denman
Vice President

Enclosure
NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF Pennsylvania

COUNTY OF Warrick

CONTRACT NUMBER N/A - Lower Merion Township

I, Gregory F. Collins, state that I am the President of Energy Systems Group, LLC, and that I am authorized to make this Affidavit on behalf of my Firm or Company and its owners, directors and officers. I am the person responsible in my Firm or Company for the prices and the amount of this Bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.

(2) Neither the price(s) nor the amount of the Bid, and neither the approximate price(s) nor the approximate amount of this Bid have been disclosed to any other firm or person who is bidder or potential bidder and they will not be disclosed to any other firm or person who is a bidder or potential bidder and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this Contract or to submit a bid higher than this bid or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) Neither the said Bidder nor any of its officers, partners, owners, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, conspired or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the bid price or the bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the TOWNSHIP OF LOWER MERION to which the attached Bid is being submitted or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(6) Energy Systems Group, LLC, its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable of any act prohibited by State or Federal Law in any jurisdiction, involving conspiracy or collusion or restriction with respect to bidding on any public contract, except as follows:

I state that Energy Systems Group, LLC understand and acknowledge that the above representations are true and relied on by the Agency in awarding the contract(s) for which this bid is submitted. I understand and my Firm or Company understands that any misstatement in this Affidavit is and shall be treated as fraudulent concealment from the Agency of the true facts relating to the submission of bids for this contract.

Subscribed and sworn to before me this 28th day of November 2018

(Signature of Notary)

(My commission expires October 4, 2022)

Gregory F. Collins, President

Name of Bidder

Energy Systems Group, LLC

Firm or Company

Signature of Bidder

©2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 1 – Official Statement of ESCO | 7
**CERTIFICATE OF LIABILITY INSURANCE**

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

**PRODUCER**

Willis of Minnesota, Inc.  
c/o 26 Century Blvd  
P.O. Box 305191  
Nashville, TN 37238

**INSURED**

Energy Systems Group, LLC  
997 Eastgate Court  
Newburgh, IN 47630

**INSURER**

<table>
<thead>
<tr>
<th>Insurer</th>
<th>Coverage</th>
<th>Policy #</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zurich American Insurance Company</td>
<td>E&amp;O</td>
<td>9243952-06</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Associated Electric &amp; Gas Insurance Service</td>
<td>General Aggregate</td>
<td>9243954-06</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Steadfast Insurance Company</td>
<td>Property Damage</td>
<td>9243954-06</td>
<td>$4,000,000</td>
</tr>
</tbody>
</table>

**CERTIFICATE NUMBER:** MB804666

**REVISION NUMBER:**

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may purport, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies. Limits shown may have been reduced by paid claims.

**DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES**

ACORD 191, Additional Remarks Schedule, may be attached if more space is required.


Lower Merion Township – Pennsylvania is Additional Insured with respect to the General Liability coverage when required by written contract executed prior to loss.

Lower Merion Township – Pennsylvania is Additional Insured with respect to the Auto Liability and Excess Liability.

**CERTIFICATE HOLDER**

Lower Merion Township – Pennsylvania

**CANCELLATION**

Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

ACORD 25 (2016/03) The ACORD name and logo are registered marks of ACORD
### ADDITIONAL REMARKS SCHEDULE

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>NAMED INSURED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willis of Minnesota, Inc.</td>
<td>Energy Systems Group, LLC</td>
</tr>
<tr>
<td>POLICY NUMBER</td>
<td>9977 Eastgate Court</td>
</tr>
<tr>
<td>See Page 1</td>
<td>Newburgh, IN 47630</td>
</tr>
<tr>
<td>CARRIER</td>
<td>NAC CODE</td>
</tr>
<tr>
<td>See Page 1</td>
<td>See Page 1</td>
</tr>
<tr>
<td>EFFECTIVE DATE</td>
<td>See Page 1</td>
</tr>
</tbody>
</table>

### ADDITIONAL REMARKS

**FORM NUMBER:** 28  
**FORM TITLE:** Certificate of Liability Insurance

General Liability, Auto Liability and Excess Liability as is afforded to Additional Insured with regard to the General Liability policy shall be Primary and Non-Contributory with any other insurance available to Additional Insured when required by contract.
Additional Insured – Automatic – Owners, Lessees Or Contractors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO 08</td>
<td>01/01/2018</td>
<td>10/01/2019</td>
<td></td>
<td>34937000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

Named Insured: Energy System Group, LLC
Address (including ZIP Code):

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

A. Section II – Who Is An Insured is amended to include as an additional insured any person or organization whom you are required to add as an additional insured on this policy under a written contract or written agreement. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:
1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf,
in the performance of your ongoing operations or "your work" as included in the "products-completed operations hazard", which is the subject of the written contract or written agreement.

However, the insurance afforded to such additional insured:
1. Only applies to the extent permitted by law; and
2. Will not be broader than that which you are required by the written contract or written agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusion applies:

This insurance does not apply to:

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or failure to render, any professional architectural, engineering or surveying services including:

a. The preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional architectural, engineering or surveying services.

Includes copyrighted material of Insurance Services Office, Inc., with its permission.
C. The following is added to Paragraph 2, Duties In The Event Of Occurrence, Offense, Claim Or Suit of Section IV – Commercial General Liability Conditions:

The additional insured must see to it that:

1. We are notified as soon as practicable of any "occurrence" or offense that may result in a claim;
2. We receive written notice of a "claim" or "suit" as soon as practicable; and
3. A request for defense and indemnity of the claim or "suit" will promptly be brought against any policy issued by another insurer under which the additional insured may be an insured in any capacity. This provision does not apply to insurance on which the additional insured is a Named Insured if the written contract or written agreement requires that this coverage be primary and non-contributory.

D. For the purposes of the coverage provided by this endorsement:

1. The following is added to the Other Insurance Condition of Section IV – Commercial General Liability Conditions:

   Primary and Noncontributory insurance

   This insurance is primary to and will not seek contribution from any other insurance available to an additional insured provided that:
   a. The additional insured is a Named Insured under such other insurance; and
   b. You are required by written contract or written agreement that this insurance be primary and not seek contribution from any other insurance available to the additional insured.

2. The following paragraph is added to Paragraph 4.b. of the Other Insurance Condition of Section IV – Commercial General Liability Conditions:

   This insurance is excess over:

   Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured under such other policy and where our policy is required by a written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

E. This endorsement does not apply to an additional insured which has been added to this policy by an endorsement showing the additional insured in a Schedule of additional insureds, and which endorsement applies specifically to that identified additional insured.

F. With respect to the insurance afforded to the additional insureds under this endorsement, the following is added to Section III – Limits of Insurance:

   The most we will pay on behalf of the additional insured is the amount of insurance:
   1. Required by the written contract or written agreement referenced in Paragraph A. of this endorsement, or
   2. Available under the applicable Limits of Insurance shown in the Declarations, whichever is less.

   This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

All other terms and conditions of this policy remain unchanged.
THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

DESIGNATED INSURED

This endorsement modifies insurance provided under the following:

- BUSINESS AUTO COVERAGE FORM
- GARAGE COVERAGE FORM
- MOTOR CARRIER COVERAGE FORM
- TRUCKERS COVERAGE FORM

With respect to coverage provided by this endorsement, the provisions of the Coverage Form apply unless modified by this endorsement.

This endorsement identifies person(s) or organization(s) who are "insureds" under the Who Is An Insured Provision of the Coverage Form. This endorsement does not alter coverage provided in the Coverage Form.

This endorsement changes the policy effective on the inception date of the policy unless another date is indicated below.

<table>
<thead>
<tr>
<th>Endorsement Effective: 10/01/2018</th>
<th>Countersigned By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Named Insured: Energy System Group, LLC</td>
<td>(Authorized Representative)</td>
</tr>
</tbody>
</table>

SCHEDULE

- **Name of Person(s) or Organization(s):**
- Any person or organization with whom you have agreed, through written contract, agreement or permit, executed prior to the loss, to provide additional insured coverage.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to the endorsement.)

Each person or organization shown in the Schedule is an "insured" for Liability Coverage, but only to the extent that person or organization qualifies as an "insured" under the Who Is An Insured Provision contained in Section II of the Coverage Form.

---

Copyright, Hawaii Insurance Bureau, Inc., 1999
Includes copyrighted material of the
Insurance Services Office, Inc., with its permission
Copyright, Insurance Services Office, Inc., 1999

CA 20 48 02 99
Blanket Notification to Others of Cancellation or Non-Renewal

<table>
<thead>
<tr>
<th>Policy No.</th>
<th>Eff. Date of Pol</th>
<th>Exp. Date of Pol</th>
<th>Eff. Date of End</th>
<th>Producer No.</th>
<th>Addl Prem</th>
<th>Return Prem</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLO 9243562</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td></td>
<td>34937000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.**

This endorsement modifies insurance provided under the:

**Commercial General Liability Coverage Part**

A. If we cancel or non-renew this Coverage Part by written notice to the first Named Insured, we will mail or deliver notification that such Coverage Part has been cancelled or non-renewed to each person or organization shown in a list provided to us by the first Named Insured if you are required by written contact or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to the first Named Insured. Such list:
   1. Must be provided to us prior to cancellation or non-renewal;
   2. Must contain the names and addresses of only the persons or organizations requiring notification that such Coverage Part has been cancelled or non-renewed; and
   3. Must be in an electronic format that is acceptable to us.

B. Our notification described in Paragraph A. of this endorsement will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to the first Named Insured. We will mail or deliver such notification to each person or organization shown in the list:
   1. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   2. At least 30 days prior to the effective date of:
      a. Cancellation, if cancelled for any reason other than nonpayment of premium; or
      b. Non-renewal, but not including conditional notice of renewal.

C. Our mailing or delivery of notification described in Paragraphs A. and B. of this endorsement is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   1. Extend the Coverage Part cancellation or non-renewal date;
   2. Negate the cancellation or non-renewal; or
   3. Provide any additional insurance that would not have been provided in the absence of this endorsement.

D. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs A. and B. of this endorsement.

All other terms and conditions of this policy remain unchanged.
Blanket Notification to Others of Cancellation or Non-Renewal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BAP 08</td>
<td>9/24/2018</td>
<td>10/01/2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the:

Commercial Automobile Coverage Part

A. If we cancel or non-renew this Coverage Part by written notice to the first Named Insured, we will mail or deliver notification that such Coverage Part has been cancelled or non-renewed to each person or organization shown in a list provided to us by the first Named Insured if you are required by written contract or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to the first Named Insured. Such list:
   1. Must be provided to us prior to cancellation or non-renewal;
   2. Must contain the names and addresses of only the persons or organizations requiring notification that such Coverage Part has been cancelled or non-renewed; and
   3. Must be in an electronic format that is acceptable to us.

B. Our notification as described in Paragraph A. of this endorsement will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to the first Named Insured. We will mail or deliver such notification to each person or organization shown in the list:
   1. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   2. At least 30 days prior to the effective date of:
      a. Cancellation, if cancelled for any reason other than nonpayment of premium; or
      b. Non-renewal, but not including conditional notice of renewal.

C. Our mailing or delivery of notification described in Paragraphs A. and B. of this endorsement is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   1. Extend the Coverage Part cancellation or non-renewal date;
   2. Negate the cancellation or non-renewal; or
   3. Provide any additional insurance that would not have been provided in the absence of this endorsement.

D. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs A. and B. of this endorsement.

All other terms and conditions of this policy remain unchanged.
BLANKET NOTIFICATION TO OTHERS OF CANCELLATION OR NONRENEWAL ENDORSEMENT

This endorsement adds the following to Part Six of the policy.

PART SIX
CONDITIONS

Blanket Notification to Others of Cancellation or Nonrenewal

1. If we cancel or non-renew this policy by written notice to you, we will mail or deliver notification that such policy has been cancelled or non-renewed to each person or organization shown in a list provided to us by you if you are required by written contract or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to you. Such list:
   a. Must be provided to us prior to cancellation or non-renewal;
   b. Must contain the names and addresses of only the persons or organizations requiring notification that such policy has been cancelled or non-renewed; and
   c. Must be in an electronic format that is acceptable to us.

2. Our notification as described in Paragraph 1. above will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to you. We will mail or deliver such notification to each person or organization shown in the list:
   a. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   b. At least 30 days prior to the effective date of:
      (1) Cancellation, if cancelled for any reason other than nonpayment of premium; or
      (2) Non-renewal, but not including conditional notice of renewal.

3. Our mailing or delivery of notification described in Paragraphs 1. and 2. above is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   a. Extend the policy cancellation or non-renewal date;
   b. Negate the cancellation or non-renewal; or
   c. Provide any additional insurance that would not have been provided in the absence of this endorsement.

4. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs 1. and 2., above.

All other terms and conditions of this policy remain unchanged.

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective 10/01/2018  Policy No. WC 92439555-08
Insured Energy System Group, LLC
Endorsement No. Premium $
Insurance Company Zurich American Insurance Company
Bid Bond
Power of Attorney
Surety Information
Bid Bond

CONTRACTOR:  
(Name, legal status and address)  
Energy Systems Group, LLC  
9877 Eastgate Court  
Newburgh, IN 47630

SURETY:  
(Name, legal status and principal place of business)  
Liberty Mutual Insurance Company  
175 Berkeley Street  
Boston, MA 02116  
State of Inc: Massachusetts

OWNER:  
(Name, legal status and address)  
Lower Merion Township  
75 East Lancaster Avenue  
Ardmore, PA 19003

BOND AMOUNT: Ten Percent of the Proposed Initial Investment (10%)

PROJECT:  
(Name, location or address, and Project number, if any)  
Request for Proposals for Energy-Efficiency Related Facilities Improvements

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 9th day of November, 2018

(Witness)  

(Witness) Kaytlin Beery

(Principal)  

(Title) Gregory F. Collins, President

(Surety)  

(Title) Julie Denman, Attorney-in-Fact
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees. To confirm the validity of this Power of Attorney call 819-832-8240 between 9:00 am and 4:30 pm EST on any business day.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint,

Julie Derrman

of the city of Grand Rapids state of Michigan as true and lawful attorney-in-fact, with full power and authority hereby conferred to sign, execute and acknowledge the following surety bond:

Principal Name: Energy Systems Group, LLC
Obligee Name: Lower Merion Township
Surety Bond Number: 43982-Liberty-18-25
Project Description: Request for Proposals for Energy-Efficiency Related Facilities Improvements

STATE OF PENNSYLVANIA
COUNTY OF MONTGOMERY

On this 27th day of February, 2017, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of, Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporatins by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA

Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021

By: Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this Article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION S. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company’s Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of November 2018.

By: Renee C. Llewellyn, Assistant Secretary
On November 9, 2018, before me, a Notary Public in and for said County and State, residing therein, duly commissioned and sworn, personally appeared

Julie Denman

known to me to be Attorney-in-Fact of Liberty Mutual Insurance Company
the corporation described in and that executed the within and foregoing instrument, and known to me to be the person who executed the said instrument in behalf of the said corporation, and he duly acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year stated in this certificate above.

My Commission Expires 7/6/2024

Marta Baker  Notary Public
Exhibit B
Non-Collusion Affidavit
EXHIBIT B

Non-Collusion Affadavit
NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF Pennsylvania

COUNTY OF Warrick

CONTRACT NUMBER N/A - Lower Merion Township

I, Gregory F. Collins, state that I am the President of Energy Systems Group, LLC, and that I am authorized to make this Affidavit on behalf of my Firm or Company and its owners, directors and officers. I am the person responsible in my Firm or Company for the prices and the amount of this Bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder.

(2) Neither the price(s) nor the amount of the Bid, and neither the approximate price(s) nor the approximate amount of this Bid have been disclosed to any other firm or person who is bidder or potential bidder and they will not be disclosed to any other firm or person who is a bidder or potential bidder and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this Contract or to submit a bid higher than this bid or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) Neither the said Bidder nor any of its officers, partners, owners, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or, to fix any overhead, profit or cost element of the bid price or the bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the TOWNSHIP OF LOWER MERION to which the attached Bid is being submitted or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(6) Energy Systems Group, LLC, its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable of any act prohibited by State or Federal Law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that Energy Systems Group, LLC understand and acknowledge that the above representations are true and relied on by the Agency in awarding the contract(s) for which this bid is submitted. I understand and my Firm or Company understands that any misstatement in this Affidavit is and shall be treated as fraudulent concealment from the Agency of the true facts relating to the submission of bids for this contract.

Subscribed and sworn to before me this 23rd day of November, 2018

(Signature of Notary)

 энергией Systems Group, LLC
Firm or Company

Gregory F. Collins, President
Name of Bidder, Title

Signature of Bidder

My commission expires October 4, 2022

APPROVED AS TO FORM.

11-28-18

[Notary Public, State of Pennsylvania]
Certificate of Insurance
**CERTIFICATE OF LIABILITY INSURANCE**

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not affirmatively or negatively amend, extend or alter the coverage afforded by the policies below. This certificate of insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder.

Important: If the certificate holder is an additional insured, the policy(s) must have additional insured provisions or be endorsed. If subrogation is waived, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

**PRODUCER**
Willis of Minnesota, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 37230191 USA

**INSURED**
Energy Systems Group, LLC
9877 Eastgate Court
Newburgh, IN 47630

**CONTACT**

- **NAME:**
- **PHONE:**
  - (A/C No.: 1-877-945-7378)
  - (A/C No.: 1-888-467-2378)
- **E-MAIL:** certificates@willis.com

**INSURER(S) ASSURING COVERAGE**
- **INSURER A:** Zurich American Insurance Company
  - **Naic #:** 16535
- **INSURER B:** Associated Electric & Gas Insurance Service
  - **Naic #:** B1164
- **INSURER C:** Steadfast Insurance Company
  - **Naic #:** 26387
- **INSURER D:**
- **INSURER E:**
- **INSURER F:**

**COVERAGES**

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies. limits shown may have been reduced by paid claims.

### COMMERCIAL GENERAL LIABILITY

- **Commercial General Liability**
- **Claims-Made**
- **Occur**

<table>
<thead>
<tr>
<th>INSD</th>
<th>TYPE OF INSURANCE</th>
<th>ADDL. SUB.</th>
<th>ADDL. SUB.</th>
<th>POLICY NUMBER</th>
<th>POLICY EFF (MM/DD/YYYY)</th>
<th>POLICY EXP (MM/DD/YYYY)</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>COMMERCIAL GENERAL LIABILITY</td>
<td></td>
<td></td>
<td>GLO 9243952-06</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td>EACH OCCURRENCE: $2,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DAMAGE TO TANGENT PREMISES (EA occurrence): $1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MED EXP (any one person): $10,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PERSONAL &amp; ADV INJURY: $2,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GENERAL AGGREGATE: $4,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PRODUCTS - COMPO/OP AGG: $4,000,000</td>
</tr>
</tbody>
</table>

### AUTOMOBILE LIABILITY

- **Any Auto**
- **Scheduled Autos Only**
- **Non-Owned Autos Only**

<table>
<thead>
<tr>
<th>INSD</th>
<th>TYPE OF INSURANCE</th>
<th>ADDL. SUB.</th>
<th>ADDL. SUB.</th>
<th>POLICY NUMBER</th>
<th>POLICY EFF (MM/DD/YYYY)</th>
<th>POLICY EXP (MM/DD/YYYY)</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ANY AUTO</td>
<td></td>
<td></td>
<td>BAP 9243954-06</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td>COMBINED SINGLE LIMIT (EA accident): $1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BODILY INJURY (Per person): $</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BODILY INJURY (Per accident): $</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PROPERTY DAMAGE (Per accident): $</td>
</tr>
</tbody>
</table>

### UMBRELLA LIAB

- **Excess Liability**

<table>
<thead>
<tr>
<th>INSD</th>
<th>TYPE OF INSURANCE</th>
<th>ADDL. SUB.</th>
<th>ADDL. SUB.</th>
<th>POLICY NUMBER</th>
<th>POLICY EFF (MM/DD/YYYY)</th>
<th>POLICY EXP (MM/DD/YYYY)</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>EXCESS LIAB</td>
<td></td>
<td></td>
<td>XL50356070P</td>
<td>10/01/2017</td>
<td>04/01/2019</td>
<td>EACH OCCURRENCE: $5,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AGGREGATE: $5,000,000</td>
</tr>
</tbody>
</table>

### WORKERS COMPENSATION AND EMPLOYER'S LIABILITY

- **Workers Compensation**
- **Employer's Liability**
- **Any Proprietary/Partner/Executive Officer/Member Excluded?**
  - **Yes/No:** N/A

<table>
<thead>
<tr>
<th>INSD</th>
<th>TYPE OF INSURANCE</th>
<th>ADDL. SUB.</th>
<th>ADDL. SUB.</th>
<th>POLICY NUMBER</th>
<th>POLICY EFF (MM/DD/YYYY)</th>
<th>POLICY EXP (MM/DD/YYYY)</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WORKERS COMPENSATION AND EMPLOYER'S LIABILITY</td>
<td></td>
<td></td>
<td>WC 9243955-08</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td>E.L. EACH ACCIDENT: $1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E.L. DISEASE - EA EMPLOYEE: $1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E.L. DISEASE - POLICY LIMIT: $1,000,000</td>
</tr>
</tbody>
</table>

### PROFESSIONAL CLAIMS MADE COVERAGE

<table>
<thead>
<tr>
<th>INSD</th>
<th>TYPE OF INSURANCE</th>
<th>ADDL. SUB.</th>
<th>ADDL. SUB.</th>
<th>POLICY NUMBER</th>
<th>POLICY EFF (MM/DD/YYYY)</th>
<th>POLICY EXP (MM/DD/YYYY)</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>PROFESSIONAL CLAIMS MADE COVERAGE</td>
<td></td>
<td></td>
<td>EOC107126901</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td>Each Claim: $1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Aggregate: $1,000,000</td>
</tr>
</tbody>
</table>

**DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES**

ACORD 101. Additional Remarks Schedule, may be attached if more space is required.


Lower Merion Township - Pennsylvania is Additional Insured with respect to the General Liability coverage when required by written contract executed prior to loss.

Lower Merion Township - Pennsylvania is Additional Insured with respect to the Auto Liability and Excess Liability.

**CERTIFICATE HOLDER**
Lower Merion Township - Pennsylvania
Attn: Ernie McNeely, Township Manager
75 East Lancaster Ave.
Ardmore, PA 19003

**CANCELLATION**

Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

Authorized Representative

© 1988-2016 ACORD CORPORATION. All rights reserved.
ADDITIONAL REMARKS SCHEDULE

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>NAMED INSURED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willis of Minnesota, Inc.</td>
<td>Energy Systems Group, LLC</td>
</tr>
<tr>
<td></td>
<td>9877 Eastgate Court</td>
</tr>
<tr>
<td></td>
<td>Newburgh, IN 47630</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POLICY NUMBER</th>
<th>SEE PAGE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARRIER</td>
<td>SEE PAGE 1</td>
</tr>
<tr>
<td>NAIC CODE</td>
<td>SEE PAGE 1</td>
</tr>
<tr>
<td>EFFECTIVE DATE</td>
<td>SEE PAGE 1</td>
</tr>
</tbody>
</table>

ADDITIONAL REMARKS

General Liability, Auto Liability and Excess Liability as is afforded to Additional Insured with regard to the General Liability policy shall be Primary and Non-Contributory with any other insurance available to Additional Insured when required by contract.
Additional Insured – Automatic – Owners, Lessees Or Contractors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GLO 06</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td></td>
<td>34937000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

Named Insured: Energy System Group, LLC

Address (including ZIP Code):

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

A. Section II – Who Is An Insured is amended to include as an additional insured any person or organization whom you are required to add as an additional insured on this policy under a written contract or written agreement. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf, in the performance of your ongoing operations or "your work" as included in the "products-completed operations hazard", which is the subject of the written contract or written agreement.

However, the insurance afforded to such additional insured:

1. Only applies to the extent permitted by law; and
2. Will not be broader than that which you are required by the written contract or written agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusion applies:

This insurance does not apply to:

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or failure to render, any professional architectural, engineering or surveying services including:

a. The preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
b. Supervisory, inspection, architectural or engineering activities.

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional architectural, engineering or surveying services.
C. The following is added to Paragraph 2. Duties In The Event Of Occurrence, Offense, Claim Or Suit of Section IV – Commercial General Liability Conditions:

The additional insured must see to it that:

1. We are notified as soon as practicable of an "occurrence" or offense that may result in a claim;
2. We receive written notice of a claim or "suit" as soon as practicable; and
3. A request for defense and indemnity of the claim or "suit" will promptly be brought against any policy issued by another insurer under which the additional insured may be an insured in any capacity. This provision does not apply to insurance on which the additional insured is a Named Insured if the written contract or written agreement requires that this coverage be primary and non-contributory.

D. For the purposes of the coverage provided by this endorsement:

1. The following is added to the Other Insurance Condition of Section IV – Commercial General Liability Conditions:

   Primary and Noncontributory insurance
   
   This insurance is primary to and will not seek contribution from any other insurance available to an additional insured provided that:
   
   a. The additional insured is a Named Insured under such other insurance; and
   
   b. You are required by written contract or written agreement that this insurance be primary and not seek contribution from any other insurance available to the additional insured.

2. The following paragraph is added to Paragraph 4.b. of the Other Insurance Condition of Section IV – Commercial General Liability Conditions:

   This insurance is excess over:

   Any of the other insurance, whether primary, excess, contingent or on any other basis, available to an additional insured, in which the additional insured on our policy is also covered as an additional insured on another policy providing coverage for the same "occurrence", offense, claim or "suit". This provision does not apply to any policy in which the additional insured is a Named Insured on such other policy and where our policy is required by a written contract or written agreement to provide coverage to the additional insured on a primary and non-contributory basis.

E. This endorsement does not apply to an additional insured which has been added to this policy by an endorsement showing the additional insured in a Schedule of additional insureds, and which endorsement applies specifically to that identified additional insured.

F. With respect to the insurance afforded to the additional insureds under this endorsement, the following is added to Section III – Limits of Insurance:

   The most we will pay on behalf of the additional insured is the amount of insurance:

   1. Required by the written contract or written agreement referenced in Paragraph A. of this endorsement; or
   
   2. Available under the applicable Limits of Insurance shown in the Declarations, whichever is less.

   This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

All other terms and conditions of this policy remain unchanged.
DESIGNATED INSURED

This endorsement modifies insurance provided under the following:

- BUSINESS AUTO COVERAGE FORM
- GARAGE COVERAGE FORM
- MOTOR CARRIER COVERAGE FORM
- TRUCKERS COVERAGE FORM

With respect to coverage provided by this endorsement, the provisions of the Coverage Form apply unless modified by this endorsement.

This endorsement identifies person(s) or organization(s) who are "insureds" under the Who Is An Insured Provision of the Coverage Form. This endorsement does not alter coverage provided in the Coverage Form.

This endorsement changes the policy effective on the inception date of the policy unless another date is indicated below.

<table>
<thead>
<tr>
<th>Endorsement Effective: 10/01/2018</th>
<th>Countersigned By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Named Insured: Energy System Group, LLC</td>
<td>(Authorized Representative)</td>
</tr>
</tbody>
</table>

SCHEDULE

Name of Person(s) or Organization(s):

Any person or organization with whom you have agreed, through written contract, agreement or permit, executed prior to the loss, to provide additional insured coverage.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to the endorsement.)

Each person or organization shown in the Schedule is an "insured" for Liability Coverage, but only to the extent that person or organization qualifies as an "insured" under the Who Is An Insured Provision contained in Section II of the Coverage Form.
Blanket Notification to Others of Cancellation or Non-Renewal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GLO 06</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td></td>
<td>34937000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the:

Commercial General Liability Coverage Part

A. If we cancel or non-renew this Coverage Part by written notice to the first Named Insured, we will mail or deliver notification that such Coverage Part has been cancelled or non-renewed to each person or organization shown in a list provided to us by the first Named Insured if you are required by written contact or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to the first Named Insured. Such list:
   1. Must be provided to us prior to cancellation or non-renewal;
   2. Must contain the names and addresses of only the persons or organizations requiring notification that such Coverage Part has been cancelled or non-renewed; and
   3. Must be in an electronic format that is acceptable to us.

B. Our notification as described in Paragraph A. of this endorsement will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to the first Named Insured. We will mail or deliver such notification to each person or organization shown in the list:
   1. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   2. At least 30 days prior to the effective date of:
      a. Cancellation, if cancelled for any reason other than nonpayment of premium; or
      b. Non-renewal, but not including conditional notice of renewal.

C. Our mailing or delivery of notification described in Paragraphs A. and B. of this endorsement is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   1. Extend the Coverage Part cancellation or non-renewal date;
   2. Negate the cancellation or non-renewal; or
   3. Provide any additional insurance that would not have been provided in the absence of this endorsement.

D. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs A. and B. of this endorsement.

All other terms and conditions of this policy remain unchanged.
Blanket Notification to Others of Cancellation or Non-Renewal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BAP 9243954-06</td>
<td>10/01/2018</td>
<td>10/01/2019</td>
<td></td>
<td>34937000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the:

Commercial Automobile Coverage Part

A. If we cancel or non-renew this Coverage Part by written notice to the first Named Insured, we will mail or deliver notification that such Coverage Part has been cancelled or non-renewed to each person or organization shown in a list provided to us by the first Named Insured if you are required by written contract or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to the first Named Insured. Such list:
   1. Must be provided to us prior to cancellation or non-renewal;
   2. Must contain the names and addresses of only the persons or organizations requiring notification that such Coverage Part has been cancelled or non-renewed; and
   3. Must be in an electronic format that is acceptable to us.

B. Our notification as described in Paragraph A of this endorsement will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to the first Named Insured. We will mail or deliver such notification to each person or organization shown in the list:
   1. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   2. At least 30 days prior to the effective date of:
      a. Cancellation, if cancelled for any reason other than nonpayment of premium; or
      b. Non-renewal, but not including conditional notice of renewal.

C. Our mailing or delivery of notification described in Paragraphs A. and B. of this endorsement is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   1. Extend the Coverage Part cancellation or non-renewal date;
   2. Negate the cancellation or non-renewal; or
   3. Provide any additional insurance that would not have been provided in the absence of this endorsement.

D. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs A. and B. of this endorsement.

All other terms and conditions of this policy remain unchanged.
BLANKET NOTIFICATION TO OTHERS OF CANCELLATION OR NONRENEWAL ENDORSEMENT

This endorsement adds the following to Part Six of the policy.

PART SIX
CONDITIONS

Blanket Notification to Others of Cancellation or Nonrenewal

1. If we cancel or non-renew this policy by written notice to you, we will mail or deliver notification that such policy has been cancelled or non-renewed to each person or organization shown in a list provided to us by you if you are required by written contract or written agreement to provide such notification. However, such notification will not be mailed or delivered if a conditional notice of renewal has been sent to you. Such list:
   a. Must be provided to us prior to cancellation or non-renewal;
   b. Must contain the names and addresses of only the persons or organizations requiring notification that such policy has been cancelled or non-renewed; and
   c. Must be in an electronic format that is acceptable to us.

2. Our notification as described in Paragraph 1. above will be based on the most recent list in our records as of the date the notice of cancellation or non-renewal is mailed or delivered to you. We will mail or deliver such notification to each person or organization shown in the list:
   a. Within seven days of the effective date of the notice of cancellation, if we cancel for non-payment of premium; or
   b. At least 30 days prior to the effective date of:
      (1) Cancellation, if cancelled for any reason other than nonpayment of premium; or
      (2) Non-renewal, but not including conditional notice of renewal.

3. Our mailing or delivery of notification described in Paragraphs 1. and 2. above is intended as a courtesy only. Our failure to provide such mailing or delivery will not:
   a. Extend the policy cancellation or non-renewal date;
   b. Negate the cancellation or non-renewal; or
   c. Provide any additional insurance that would not have been provided in the absence of this endorsement.

4. We are not responsible for the accuracy, integrity, timeliness and validity of information contained in the list provided to us as described in Paragraphs 1. and 2. above.

All other terms and conditions of this policy remain unchanged.

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective 10/01/2018   Policy No. WC 9243955-08   Endorsement No.
Insured  Energy System Group, LLC   Insurance Company Zurich American Insurance Company
Premium $
EXECUTIVE SUMMARY

Energy Systems Group (ESG) is pleased to submit this response to your RFP for an Energy Performance Contract. You will find a summary of ESG’s capabilities as an Energy Services Company (ESCO), our team of local trusted partners, our significant Local Government experience, our financial strength to back our guarantees and our long history of performance contracting. We have the proven experience, talent and desire to be your preferred partner on this project, and look forward to the opportunity of working with you.

Like many local governments throughout the nation, Lower Merion Township must make difficult choices regarding implementation of short-term solutions or investing in more long-term, quality infrastructure improvements. Investing in a LED and HVAC upgrade to your existing municipal street lighting system and facilities provides not only a significant cost savings but is one the few things that has a benefit for all our your residents. Faced with declining tax revenues, and the need to promote and add jobs, Energy Systems Group is the best partner to assist Lower Merion Township in developing a comprehensive guaranteed energy savings program that will achieve long-term upgrades and substantial utility bill reductions.
How Energy Systems Group can help:

- Guaranteed energy, water and operational cost reductions
- Guaranteed greenhouse gas emission reductions
- A product, vendor and contractor neutral approach
- A team of trusted local partners that has completed similar LED streetlight and HVAC retrofits at *Ridley Township, Doylestown Borough, Morrisville Borough, West Norriton Township, West Chester Borough* and many other municipalities in the PECO utility footprint.
- A firm contract price, with no change orders
- On-time project completion for timely realization of financial benefits
- Training of your staff to properly maintain and operate the new equipment

The information in this proposal will show “why” Energy Systems Group is the leader in customer satisfaction and how we set ourselves apart from the competition. Our value is manifested in having the best expertise, financial strength, and long term dependability. But most importantly, our track record shows our commitment to forming long-term partnerships with our customers, helping them meet infrastructure and environmental goals and standing behind our workmanship 100%.

Since 1994, ESG has been implementing energy conservation projects and has been awarded over 684 contracts throughout the country with a total value in excess of $2.8 Billion dollars.

Our growth and expansion comes as a result of our dedication to project completion — not just with an “on-time and on-budget” mentality — but with a foundational business philosophy and a consistent objective of overachieving to provide exceptional value and results that translate into the highest level of customer satisfaction and deliver the greatest possible benefits to each of our Customers. Another important factor contributing to our success is the fact that ESG routinely matches our project team and their capabilities and experience with each specific type of project.

**The ESG Team** takes great pride in its proven ability to make our customer’s vision a reality through professional, innovative, and reliable design-build solutions. Our broad depth of expertise underpins our commitment to providing Lower Merion Township with the highest quality Energy Performance Contract possible and executing the project on time, within budget, and with guaranteed results.

As a comprehensive and NAESCO-accredited Energy Service Provider, ESG designs, develops, implements, finances, operates, maintains and verifies innovative, customer-focused energy and operation solutions that enhance your facilities, productivity, comfort, and finances allowing you to focus on meeting your core mission of educating your community.
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

This RFP response details our approach to project development and implementation, our commitment to earning our customers’ respect, and our proven experience and ability to implement GESA projects. As a business partner and a product neutral company, our streamlined and transparent approach affords Lower Merion Township the opportunity to make fact-based decisions for your Township and recommended solutions without proprietary manufactured products influencing recommendations. With ESG, Lower Merion Township can be confident that this project will be delivered with a quality-driven transparent approach, founded on flexibility, responsibility, and collaboration.

As you review this RFP response, we are confident you will find that ESG upholds the demonstrated expertise and commitment to dedicate the necessary resources to complete this project successfully and in a timely manner. The comprehensive services our team offers fully complement every requirement of the RFP’s terms, conditions, and expectations.

We are an Independent ESCO. We are Product, Vender and Contractor neutral and are committed to local suppliers and vendors.
Project Options contained in this proposal:

Our engineering and operations team analyzed and evaluated numerous LED manufacturers and HVAC products for reliability, compatibility to your existing infrastructure, warranty and energy savings. The ESG engineering and operations team then utilized our time proven process to develop project options that addressed the Township's key objectives. Three options are presented as requested in the RFP.

- Option 1a – Recommended Package: 15-year cash flow
- Option 1b – Recommended Package: 20-year cash flow
- Option 2a – Core Enhancement: 15-year cash flow
- Option 2b – Core Enhancement: 20-year cash flow
- Option 3a – All Measures: 15-year cash flow
- Option 3b – All Measures: 20-year cash flow

Of course, these are only three of many possible suggestions, and the administration will ultimately tailor these options to best meet the needs of the Township.

In the financial section of this proposal, we have included a business case analysis for each of the three options. The detailed scope descriptions are provided in Section 4: Technical.
Lower Merion Township / PA Guaranteed Energy Savings Act  
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Project Option 1:
This option provides a 15 & 20 year financing term of the Recommended project. A brief description of the program follows and is detailed in Section 4: Technical.

Project 1 Highlights:

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements (Furnace)</td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wall packs</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - HID</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>LED Atrium Lighting</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Cobra</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>15 Year</th>
<th>20 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Cost Option 1:</td>
<td>$3,567,567</td>
<td>$3,567,567</td>
</tr>
<tr>
<td>Total Project Savings Option 1:</td>
<td>$6,438,969</td>
<td>$8,770,255</td>
</tr>
<tr>
<td>Utility Savings:</td>
<td>$4,733,505</td>
<td>$6,604,136</td>
</tr>
<tr>
<td>Operational Savings:</td>
<td>$1,035,813</td>
<td>$1,496,468</td>
</tr>
<tr>
<td>Rebates:</td>
<td>$277,651</td>
<td>$277,651</td>
</tr>
<tr>
<td>CIP:</td>
<td>$392,000</td>
<td>$392,000</td>
</tr>
</tbody>
</table>

Note: ESG recommends a customer-controlled contingency of 3%.
Project Option 2:
This option provides a 15 & 20 year financing term of the Core Enhancements project. A brief description of the program follows and is detailed in Section 4: Technical.

Project 2 Highlights:

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements (Furnace)</td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wall packs</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - HID</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Cobra</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
</tr>
</tbody>
</table>

15 Year                                                                 | 20 Year                                                                 |
Project Cost Option 2:                                                   Project Cost Option 2:                                             |
$ 3,593,251                                                             $ 3,593,251
Total Project Savings Option 2:                                           Total Project Savings Option 2:                                      |
$ 6,438,969                                                             $ 8,770,255
Utility Savings:                                                         Utility Savings:                                                        |
$ 4,733,505                                                             $ 6,604,136
Operational Savings:                                                     Operational Savings:                                                     |
$ 1,035,813                                                             $ 1,496,468
Rebates:                                                               Rebates:                                                                 |
$ 277,651                                                              $ 277,651
CIP:                                                                    CIP:                                                                      |
$ 392,000                                                              $ 392,000

Note: ESG recommends a customer-controlled contingency of 3%. 
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Project Option 3:
This option provides a 15 & 20 year financing term of the Core Enhancements project. A brief description of the program follows and is detailed in Section 4: Technical.

Project 3 Highlights:

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDG ENV</td>
<td>Attic Insulation</td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Install Air Curtain</td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Window Replacements</td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements (Furnace)</td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
</tr>
<tr>
<td>DWH w/ CONTROLS</td>
<td>DHW Heater Replacement</td>
</tr>
<tr>
<td>HWP w/ CONTROLS</td>
<td>Motor Replacement (Pool Pump)</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wallpacks</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - HID</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>LED Atrium Lighting</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Cobra</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Controls</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
</tr>
<tr>
<td>RTU w/ CONTROLS</td>
<td>RTU Replacements</td>
</tr>
<tr>
<td>SPLIT w/ CONTROLS</td>
<td>DX Unit Replacements</td>
</tr>
</tbody>
</table>
## Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

<table>
<thead>
<tr>
<th></th>
<th>15 Year</th>
<th>20 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Cost Option 2:</td>
<td>$ 5,106,328</td>
<td>Project Cost Option 2:</td>
</tr>
<tr>
<td>Total Project Savings Option 2:</td>
<td>$ 7,006,582</td>
<td>Total Project Savings Option 2:</td>
</tr>
<tr>
<td>Utility Savings:</td>
<td>$ 5,144,118</td>
<td>Utility Savings:</td>
</tr>
<tr>
<td>Operational Savings:</td>
<td>$ 1,035,813</td>
<td>Operational Savings:</td>
</tr>
<tr>
<td>Rebates:</td>
<td>$ 304,651</td>
<td>Rebates:</td>
</tr>
<tr>
<td>CIP:</td>
<td>$ 522,000</td>
<td>CIP:</td>
</tr>
</tbody>
</table>

Note: ESG recommends a customer-controlled contingency of 3%.
In Summary, Why Select ESG?

Our approach to this response has been to demonstrate our qualifications and capabilities and specifically outline our Team’s readiness and in-depth expertise for the development and implementation of a comprehensive guaranteed energy performance project. This RFP response is a sample of our dedication to evaluating all potential issues for possible repair or upgrade. Our unwavering commitment to customers is what characterizes ESG as a leading energy services provider that customers trust. We are experienced, versatile, innovative and creative, and appropriately staffed to provide Lower Merion Township with the cutting-edge solutions and financial viability required. ESG is a quality-driven, product-neutral company. We offer you the opportunity to select a firm whose focus on the client is still our number one priority.

ESG is committed to provide the absolute best and most comprehensive services for Lower Merion Township. We feel that our team experience and footprint can provide state-of-art services quickly and efficiently for Lower Merion Township. We would like to thank you for your consideration and look forward to working with you.

**Items to Consider When Choosing a Partner...**

Consider these factors when deciding which firm to engage as your long-term partner:

- **Financial capacity of the company backing the savings guarantee.** ESG is a wholly-owned subsidiary of Vectren Corporation (NYSE:VVC), an energy holding company headquartered in Evansville, Indiana with approximately $5 billion in assets.
- **Vendor Neutrality.** ESG is vendor, ECM and Contractor neutral and will provide your Municipality with a consultative best-value approach.
- **Accuracy of the projected savings.** Year after year, Energy Systems Group meets or exceeds annual savings guarantees more than 99% of the time.
- **Volume of projects with which to share best practices and bring innovations to each new project.** Since 1994, ESG has implemented over $2.8 billion in projects for over 408 customers in North America. Of these projects, approximately $1 billion represent multi-phase or multi-contract projects with recurring customer.
- **Local Government Expertise.** Our teams are aligned to work with municipalities. Energy Systems Group has over 140 performance contracts in the Local Government market. The team implementing these projects are members of PML, PSBA, CCAP and multiple other Local Government specific organizations. They develop best practices in the Local Government space, and present to these organizations on a wide range of innovative infrastructure and finance-related topics.
Section 3: ESCO Background and Qualifications

Energy Systems Group (ESG) is a leading energy services provider that specializes in energy efficiency, sustainability, and infrastructure improvement projects. ESG’s projects contain a number of unique elements that are professionally developed, ensuring that all ESG projects are cost-effective, sustainable, and energy efficient. ESG has implemented over 600 energy efficiency and facility infrastructure improvement projects totaling over $2.8 billion for more than 400 customers in 35 States and the Virgin Islands.

Founded in 1994, Energy Systems Group is a nationally-recognized Energy Service Provider (ESP) accredited by the National Association of Energy Services Companies (NAESCO). ESG is a wholly-owned subsidiary of Vectren Corporation (NYSE: VVC), an energy holding company headquartered in Evansville, Indiana with approximately $5 billion in assets. ESG is comprised of a professional team of over 350 employees located in 26 states, including 44 Registered Professional Engineers (P.E.) licensed throughout the United States.

Our Design-Bid-Build (DBB) and Energy Performance Contracting (EPC) capabilities and infrastructure improvement solutions are centered on efficiency, resiliency, and modernization ensuring measurable benefits and proven project delivery methods. Our project approaches are customer-centric and innovative, and our team takes pride in “doing what we promise” with a dedicated commitment to exceeding expectations. ESG’s DBB and EPC processes are driven by specialized teams working together from start to finish with open communication and purposeful collaboration to deliver otherwise unachievable results. Our customers have told us that what differentiates ESG from other companies is how we take the time to fully understand the goals they are trying to achieve, which often go far beyond energy savings. Our driving philosophy is that when we sit at the same table with our customer, great ideas—the best ideas—are born and the way is paved for creative solutions to take hold; resulting in costs minimized, schedules streamlined, and energy efficiencies realized. ESG will provide the Lower Merion Township (LMT) with solutions that maximize benefits through a highly qualified and completely committed team.

This response includes examples of how we work, how we earn customers’ trust, and why we have been successful in implementing EPC and DBB projects. Our transparent process allows the township to make a fact-based decision on what services and solutions work best for their facilities. As a brand and product-neutral company, we design projects and install equipment based on the best value to our customers.
Trusted Partner

ESG characterizes itself as an engineering, construction and energy services company that customers trust, with a dedicated focus on building long-lasting and trusting relationships and producing superior results that exceed customers’ expectations. Our record of success, corporate culture and values reflect those of a company that understands the importance of each customer and the partnership required to successfully implement a project. As a brand and product-neutral energy services provider, we design projects and install equipment based on the value to our customers. With Energy Systems Group, you can be confident that our solutions are customer-centric.

Leading Expertise

The ESG team is comprised of certified and licensed professional engineers, project managers, and energy and operations specialists, and strong business leaders that bring exceptional expertise and proven results in developing and implementing comprehensive design, construction, and energy infrastructure projects. We build integrated teams of specialists based on the requirements of each project, working in concert with each customer to plan, price, design, and implement the most valuable, cost-effective, and efficient results.

The ESG team brings proven expertise in the design and construction of innovative energy efficiency and onsite energy generation projects of varying complexity and size, including Combined Heat and Power (CHP) plants, biomass/biogas recovery systems and processing facilities (wastewater, landfill gas, anaerobic digesters, etc.) and diverse renewable energy technologies. ESG’s comprehensive solutions include engineering and design-build, project development and implementation, operations and maintenance services, facility audits, facilitating project financing, and measurement and verification of savings.

Our Commitment

ESG is committed to conducting business safely and ethically and growing the communities where we operate. This instills trust and confidence in our business and community relationships. To protect the integrity of our relationships, we expect our customers, subcontractors, suppliers, and vendors to share our commitment to safe and ethical conduct. Every day we strive for an environment that reflects our values, as well as ethical and legal requirements. Every interaction that we have, every decision that we make and every goal that we pursue is approached with a dedication to ethical business conduct. As a customer-focused company, the development of long-lasting and trusting relationships is the foundation of our business.

“ESG has both the resources and technical abilities to provide the highest level of success possible for any energy savings project for municipalities regardless of the size. They will exceed the expectation of their clients and educate the entire group of stakeholders throughout the process. They are truly a pleasure to work with.”

– Thomas H. Logan, P.E.
City of Covington, Kentucky - Director of Public Improvements/City Engineer
Our business model upholds our commitment to giving back to our customers' communities and progressively partnering to promote local economic growth, job creation, education, and environmental stewardship. ESG’s commitment to community includes progressively strengthening partnerships and growth opportunities for small and minority-owned businesses; working with local vendors and subcontractors; establishing scholarships and internships; preparing tomorrow's workforce through education and leadership development through programs such as STEM (Science, Technology, Engineering and Math) and FIRST (For Inspiration and Recognition of Science and Technology) Robotics; advancing our communities through revitalization; and working together to conserve natural resources and energy.

Focused on Sustainability

Through the implementation of comprehensive and turnkey energy savings programs, ESG helps reduce carbon footprints and promote sustainability, energy efficiency, and environmental conservation. ESG has reduced its customers' carbon footprint by over 752,000 metric tons of carbon dioxide. Over the next decade, this is equivalent to one of the following:

- Removal of emissions equivalent to over 1,475,000 cars
- Planting over 1,603,000 acres of forest
- Creating enough energy to power more than 651,000 homes

Leading Industry Knowledge, Affiliations, and Awards

ESG is a leading partner and member of key organizations, including the U.S. Green Building Council, the U.S. Department of Energy, the American College and University President’s Climate Commitment, the Association for the Advancement of Sustainability in Higher Education, the American Biogas Council, the Landfill Methane Outreach Program, the Energy Services Coalition, and many more. Our projects and customers have earned several awards and certifications. From Leadership in Energy and Environmental Design (LEED) certifications to being recognized by the U.S. Department of Environmental Protection as Energy STAR Leaders, our innovation, performance, and expertise is award-winning.

ESG was awarded a Multiple Award Task Order Contract (MATOC) by the U.S. Army Corps of Engineers (USACE), Engineering and Support Center, Huntsville, working with the Army Energy Initiatives Task Force (EITF). ESG is one of 13 companies selected as a qualified biomass technology contractor that will be eligible to bid on future biomass renewable energy task orders, which includes municipal solid waste and waste-to-energy.
Section 3A: References

Provide a minimum of five (5) references for projects where the ESCO has provided a performance contract of at least 50% of the cost of this project that included a minimum of financial guarantee, bundled energy retrofits, ongoing support services, and project financing. Provide a list of similar guaranteed performance contracting energy efficiency programs sold by the ESCO, to include:

6.3.1.1 Customer’s name and location.
6.3.1.2 Total Project cost and savings.
6.3.1.3 Name, title, and telephone numbers of project references.
6.3.1.4 Brief description of the project’s scope of services and status.

The right to call the references provided by the ESCO will be presumed by the Township.

Energy Systems Group and our team of partners is well versed and experienced in several market sectors, including: Local Municipalities, State Government, K-12 Schools, Healthcare facilities, Universities, and Community Colleges. Within each of these market sectors our teams deploy cutting-edge technologies that reduce energy costs and address the core needs of the Customer. Our Customer’s needs tend to be primarily HVAC related but the demands of being environmentally conscious means we are implementing more renewable energy and “green” solutions within all market sectors.

Our written response provides insight into ESG as a company, our work ethic, integrity, determination, and our company “personality.” It is an important gauge of our merit to serve as your energy efficiency service provider. Our project resumes span the range of Energy Conservation Measures (ECMs). From basic lighting and controls to sophisticated cogeneration central utility plants, ESG has been successful in implementing customized projects of all sizes — we are nationally recognized as delivering superior quality projects that exceed client expectations for performance!

This section contains projects that are representative of the many satisfied customers that ESG and our team of partners have in our portfolio. We have selected these projects because they represent a cross-section of or Pennsylvania Local Government clients that represent the foundation of our customer base. Many clients enter into multi-phase projects with us. Multiple procurements are important as they are a key indicator of the level of client satisfaction achieved during the construction stage. Keeping these clients satisfied through the ongoing services phase is equally as important as it demonstrates our commitment to the overall success of a program.

Project Reference Information has been included on the following pages for each of the projects we included as requested. We have also included a listing of additional Pennsylvania Local Government projects, that ESG and our team of trusted partners has been awarded. We have a complete resume and are experienced in evaluating and implementing a diverse range of upgrades and believes these projects highlight those abilities.
| Customer Name and Address | Ridley Township  
100 E. MacDade Blvd  
Folsom, PA 19033 |
|--------------------------|--------------------------------------------------|
| **Summary of Improvements** | 2067 LED street lights & ornamental fixtures  
432 Traffic light retrofits  
Act 129 Rebates |
| **Project Size and Value** | $1,686,595 |
| **Customer Contact Name and Phone Number** | Mr. Ed Pisani  
Township Manager  
100 E. MacDade Blvd  
Folsom, PA 19033  
(610) 534-2545 |
| **Contract Terms (Length of Guarantee)** | 15 Years |
| **Guaranteed Savings – Actual Achieved vs. Guarantee** | $79,217 - Guaranteed annual utility savings  
$26,229 - Operational and maintenance savings |
| **Type of Financing** | Bank financing |
| Customer Name and Address | Borough of Doylestown  
|---------------------------|---------------------------------------------------|
|                           | 57 West Court Street  
|                           | Doylestown, PA 18901  
| **Summary of Improvements** | 908 LED street lights ornamental fixtures  
|                           | Solar PV array for Public Works garage  
|                           | Public Works fueling station and storage tank  
|                           | Interior lighting upgrade  
|                           | Water distribution SCADA control system  
|                           | VDF retrofits  
|                           | Right sizing/right typing water meters  
|                           | Chlorine analyzer upgrade  
|                           | Act 129 Rebates  
| **Project Size and Value** | $1,591,845  
| **Customer Contact**  
| **Name and Phone Number** | Mr. John Davis  
|                           | Borough Manager  
|                           | 57 West Court Street  
|                           | Doylestown, PA 18901  
|                           | (215) 345-4140  
| **Contract Terms**  
| **(Length of Guarantee)** | 15 Years  
| **Guaranteed Savings – Actual Achieved vs. Guarantee** | $55,988 - Guaranteed annual utility savings  
|                           | $43,551 - Operational and maintenance savings  
| **Type of Financing** | Finance authority loan  

energysystemsgroup.com

©2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 3 – ESCO Background and Qualifications | 6
## Summary of Improvements
- 632 LED street lights
- HVAC upgrades
- Interior / exterior lighting retrofits
- Boiler replacement
- DDC control system
- Window replacement
- Building envelope
- Act 129 rebates

## Project Size and Value
$1,398,901

## Customer Contact
Scott Mitchell  
Borough Manager  
35 Union Street  
Morrisville, PA 19067  
(215) 295-8181

## Contract Terms
17 Years

## Guaranteed Savings – Actual Achieved vs. Guarantee
$43,047 guaranteed annual utility savings  
$33,963 operational savings

## Type of Financing
Private investment finance
| Customer Name and Address | West Norriton Township  
1630 West Marshall Street  
Jeffersonville, PA 19403 |
|--------------------------|---------------------------------------------------------------------|
| **Summary of Improvements** | 887 LED street lights  
Street light buy-back from local utility  
Utility make-ready work  
Act 129 Rebates |
| **Project Size and Value** | $1,147,839 |
| **Customer Contact Name and Phone Number** | Jason Bobst  
Township Manager  
1630 West Marshall Street  
Jeffersonville, PA 19403  
(610) 631-0450 |
| **Contract Terms (Length of Guarantee)** | 3 Years |
| **Guaranteed Savings – Actual Achieved vs. Guarantee** | Guaranteed Savings $ 120,630 annually |
| **Type of Financing** | Private investment finance |
| Customer Name and Address | Borough of West Chester  
401 East Gay Street  
West Chester, PA 19380 |
|---------------------------|------------------------------------------------------------------|
| Summary of Improvements   | 806 LED street lights  
252 LED ornamental street lights  
Wireless control system  
Act 129 rebates |
| Project Size and Value    | $938,236 |
| Customer Contact Name and Phone Number | Michael Perrone  
Borough Manager  
401 East Gay Street  
West Chester, PA 19380  
(610) 692-7574 |
| Contract Terms (Length of Guarantee) | 15 Years |
| Guaranteed Savings – Actual Achieved vs. Guarantee | $59,888 - guaranteed annual utility and operational savings and capital cost avoidance |
| Type of Financing         | Bank financing |
Additional Pennsylvania Municipal Projects:

City of Pittston Phase I & 2
- LED street lighting
- LED ornamental lighting retrofit
- Building automation upgrade at Public Library
- Boiler repair
- HVAC upgrade City Hall
- Interior lighting upgrade
- LED Exterior lighting upgrade
- Controls upgrade
- Building envelope improvements
- Building security upgrade and access controls
- Ceiling replacement

Upper Chichester Township
- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED parking lot upgrade
- Boiler & Boiler control upgrade
- Water conservation County wide
- Building envelope improvement County wide
- HVAC controls upgrade

Aston Township
- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Bensalem Township
- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade
Cheltenham Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Hatfield Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade
- PECO streetlight buyback

Kennett Square Borough

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Lansdale Borough

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Lansdowne Borough

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade
Lower Merion Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- PECO Streetlight buyback
- LED exterior lighting upgrade

Media Borough

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Middletown Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Phoenixville Borough

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Upper Dublin Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade
Warrington Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade

Whitemarsh Township

- LED streetlight upgrade
- LED ornamental lighting upgrade
- LED traffic lighting upgrade
- Wireless controls analysis
- LED exterior lighting upgrade
Section 4: Technical

Proposals should contain the following information about the ESCO’s technical approach to meeting the Township comfort, energy efficiency, and operating costs reduction objectives:

- List specific technical solutions or ECMs (FIMs) you propose to implement in the facility. Include specifications of each of the conservation measures in regards to the following: manufacturer, quantity, and location within the building.

- Include specific ongoing support training and/or maintenance the ESCO proposes to implement as part of this program.

- Include any additional information, as desired, about the ESCO’s technical approach to the project. ESCOs should highlight their unique qualifications, technical expertise, and expansion capabilities.

Overview

Energy Systems Group’s (ESG’s) methodology for engineering a project has the following characteristics:

Comprehensive…ESG’s entire Energy Savings Services process includes the Facility Survey and Audit and Data Acquisition; Measures Selection, Cost Development, Project Savings Calculations, and Utility Incentives and Rebates; and critical phases associated with establishing a baseline.

Customer Oriented….From the inception of our work with customers on an Energy Savings Services program, we strive to establish a partnership through working closely and communicating at regular intervals with our customers to obtain both input and feedback to ensure our efforts are in line with their requirements.

Guided by Industry-Accepted Standards….We utilize and have integrated into our process and procedures the relevant ASHRAE, IESNA, ANSI, ICC, CFC, CGC, NFPA, AWWA, AIA, IPMVP, NAESCO, AEE, and other industry standards to provide assurance to our customers that our approach is solid and has merit.

Effective and Efficient….Through years of experience, we have developed ESG “Best Practices” that take into account the countless assessments and audits we have performed. We have distilled and refined the best procedures and techniques into highly effective steps and procedures and developed an overall methodology that is highly effective and very efficient.

Because of our long-term financial and performance guarantees, the equipment selection process and the quality of installation from our subcontractors and ESG’s Performance Guarantee eliminates risk through the guarantee term and beyond.
We evaluate and analyze the following items prior to equipment selection:

- Product Warranty
- Energy Efficiency
- Life Cycle Cost
- Manufacturer Location
- ESG & Market Reliability
- Ease of Installation
- Serviceability/Factory Support
- Compressor Technology
- Burner Technology
- Motor Technology
- Drive Technology
- Open Protocol – Communications
- Sound Levels
- Refrigerant Technology
- Product Life Cycle/Parts Availability

ESG's specific technical solutions or Energy Conservation Measures (ECMs) are summarized in Figure 1 on the following page.
### ECM Matrix

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
<th>Ardmore Ave Pool Complex</th>
<th>Ardmore Community Center</th>
<th>Ardmore Library</th>
<th>Bala Cynwyd Library Complex</th>
<th>Belmont Community Center</th>
<th>Belmont Hills Pool Complex</th>
<th>Bynum Preserve Community Center</th>
<th>County Line Complex Complex</th>
<th>Domestic Animal Detention Center (Koegel Complex)</th>
<th>Fleet</th>
<th>Highway's</th>
<th>Ludington Library</th>
<th>PALM Building</th>
<th>PA State Library</th>
<th>Public Safety Building</th>
<th>Police Station Building</th>
<th>Township Administration Building</th>
<th>Vernon Young</th>
<th>Warner Ave (Post)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDG ENV</td>
<td>Attic Insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Building Sealing &amp; weatherization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Install Air Curtain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Window Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements - Condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWH w/ CONTROLS</td>
<td>DHW Heater Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHP w/ CONTROLS</td>
<td>Motor Replacement (Pool Pump)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wallpacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - HID</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Center</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Cobra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTU w/ CONTROLS</td>
<td>RTU Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPLIT w/ CONTROLS</td>
<td>DX Unit Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Contents
1. Overview ................................................................................................................. 1
2. ECM: Lighting: Street (ECM 1a, 1b, 1c, 1d, 1e) ...................................................... 5
3. ECM: Lighting Upgrades, Interior, Exterior (ECM 2 Other Lighting) ...................... 23
4. ECM: Replace Boilers (ECM 3) .................................................................................. 35
5. ECM: Replace Chillers (ECM 4) ................................................................................. 43
6. ECM: Controls Upgrades / Recommission (ECM 5 & 6) .......................................... 48
7. ECM: Replace RTUs/SPLIT (ECM 7) .......................................................................... 55
8. ECM: Air Curtains (ECM 8a) .................................................................................... 60
9. ECM: New Domestic Hot Water (DHW) Heaters (ECM 8b, 8c) ................................. 63
10. ECM: New Pool Pump ............................................................................................. 67
11. ECM: Attic Insulation ECM(8e) ................................................................................. 71
12. ECM: Attic Insulation ECM(8f) ................................................................................. 76
13. ECM: Building Envelope ........................................................................................... 81
14. HVAC Training .......................................................................................................... 90
15. ECM Academy of STEAM/Health Exploration ...................................................... 95
16. Maintenance ............................................................................................................... 96
1 ECM: Lighting: Street (ECM 1a, 1b,1c,1d,1e)

1.1 Description

The measure proposes upgrading fluorescent and other lighting technologies with more efficient Light Emitting Diode (LED) technology. The measure discussed in this section applies to street lighting for all of the township roadways.

1.2 Existing Conditions

The existing street lighting system consists of various types of HID lighting from Mercury Vapor to Sodium and Metal Halide. There approximately 4,000 cobra head lighting fixtures installed through out the township roadways and with 1,000 decorate type fixtures located in the downtown areas.
The quantity, type, energy usage, and costs of the street lights present in the Township according to the RFP Information provided which where extracted from the PECO bill(s) are shown below. The quantities, types and wattages of fixtures shown may vary from the actual street lighting fixture quantities, types and wattages present in the township.

Because the energy cost savings that are realized from this project will be reflected through changes in the utility bill, the baseline for energy cost is also based on the street lights listed on the bill - and not what is identified as installed in the township as a result of a field audit. This table shows the baseline for energy costs modeled in this RFP response.

Table 1.2-1. Street Lighting Baseline.

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Fixture (Cobra Head)</th>
<th>Quantity</th>
<th>Billed Wattage</th>
<th>Annual Energy Use (kWh)</th>
<th>Annual Energy Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury Vapor</td>
<td>04000M</td>
<td>100W MV</td>
<td>869</td>
<td>115</td>
<td>437,715</td>
<td>$33,441</td>
</tr>
<tr>
<td>Mercury Vapor</td>
<td>08000M</td>
<td>175W MV</td>
<td>362</td>
<td>191</td>
<td>302,842</td>
<td>$23,137</td>
</tr>
<tr>
<td>Mercury Vapor</td>
<td>12000M</td>
<td>250W MV</td>
<td>100</td>
<td>275</td>
<td>120,450</td>
<td>$9,202</td>
</tr>
<tr>
<td>Mercury Vapor</td>
<td>20000M</td>
<td>400W MV</td>
<td>16</td>
<td>429</td>
<td>30,064</td>
<td>$2,297</td>
</tr>
<tr>
<td>Sodium Vapor</td>
<td>05800S</td>
<td>70W HPS</td>
<td>1008</td>
<td>94</td>
<td>415,014</td>
<td>$31,707</td>
</tr>
<tr>
<td>Sodium Vapor</td>
<td>09500S</td>
<td>100W HPS</td>
<td>1</td>
<td>131</td>
<td>574</td>
<td>$44</td>
</tr>
<tr>
<td>Sodium Vapor</td>
<td>15000S</td>
<td>150W HPS</td>
<td>131</td>
<td>192</td>
<td>110,166</td>
<td>$8,417</td>
</tr>
<tr>
<td>Sodium Vapor</td>
<td>25000S</td>
<td>250W HPS</td>
<td>222</td>
<td>294</td>
<td>285,874</td>
<td>$21,841</td>
</tr>
<tr>
<td>Sodium Vapor</td>
<td>50000S</td>
<td>400W HPS</td>
<td>75</td>
<td>450</td>
<td>147,825</td>
<td>$11,294</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>07800H</td>
<td>100W MH</td>
<td>1489</td>
<td>131</td>
<td>854,358</td>
<td>$65,273</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>13000H</td>
<td>175W MH</td>
<td>333</td>
<td>192</td>
<td>280,040</td>
<td>$21,395</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>20500H</td>
<td>250W MH</td>
<td>267</td>
<td>294</td>
<td>343,821</td>
<td>$26,258</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>36000H</td>
<td>400W MH</td>
<td>192</td>
<td>450</td>
<td>378,432</td>
<td>$28,912</td>
</tr>
<tr>
<td>LED</td>
<td>-</td>
<td>210W LED</td>
<td>3</td>
<td>210</td>
<td>2,759</td>
<td>$211</td>
</tr>
</tbody>
</table>

| Total           | 5068       | 3,709,934            |          |                |                         | $283,438               |
| Service Location Distribution Charge* | 5068 | | | | | $431,185 |
| Modeled Cost for Cobra-heads (annual) | 5068 | | | | | $714,623 |

*Service Location Distribution Charge, also known as the "Tap Fee" is based on $6.64 per location, per month. This fee is not impacted by the energy reduction from converting street lights to LED, however, it may be impacted if the final quantity of street lights identified during the Investment Grade Audit differs from that listed on your bill.
1.3  Proposed Scope

LED technology, the latest in lighting technology advancement, offers high-quality lighting that is effective and efficient. The longevity of the technology reduces the maintenance burden on the building staff, making LEDs highly desirable and an expedient choice.

As successful street lighting project begins with a well-defined design process to ensure accurate existing street lighting quantities, locations and wattages are documented. At ESG we follow the design process listed below:
LED Streetlight Design Process overview

1. Receive final raw audit data and finalize with municipality
2. Assign Road Type to each record
   a.) Residential
   b.) Collector (connects residential to major)
   c.) Major
   d.) Major State or Highway
3. Prescribe LED solution based on following attributes:
   a.) Road Type
   b.) Number of lanes on road
   c.) Pole location (street or intersection)
   d.) Fixture style
   e.) Existing lamp wattage and type
4. Map prescribed LED solution and look for outliers
   a.) Outliers will identify "non-conforming" existing fixtures
5. Analyze outliers
   a.) Conform to prescriptive (e.g. treat 175W in a row of 100W poles as a 100 W)
   b.) Retrofit non-conforming to appropriate LED (e.g. assume 175W was for a reason and replace with 175W prescriptive LED)
   c.) Present to municipality for discussion (e.g. major state road has 100W poles, prescriptive design for road type is 108W)
6. Generate photometrics for sample population
7. Present recommended design
   a.) Include rationale for outliers as supporting document
   b.) Photometrics
   c.) Roadway use
   d.) Municipality preference
### Sample Design Standards

#### Residential Road
Type II distribution for street, Type III or V distribution for intersection

<table>
<thead>
<tr>
<th>Existing Lamp Type</th>
<th>Existing Lamp Watts</th>
<th>Prescriptive LED Upgrade Watts</th>
<th>Final LED Upgrade Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury Vapor</td>
<td>175W or less</td>
<td>35W</td>
<td>35W / 54 for Type 2 residential collector</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>175W or less</td>
<td>35W</td>
<td>35W / 54 for Type 2 residential collector</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>100W or less</td>
<td>35W</td>
<td>35W / 54 for Type 2 residential collector</td>
</tr>
</tbody>
</table>

#### Light Commercial Road
Type II distribution for street, Type III or V distribution for intersection

<table>
<thead>
<tr>
<th>Existing Lamp Type</th>
<th>Existing Lamp Watts</th>
<th>Prescriptive LED Upgrade Watts</th>
<th>Final LED Upgrade Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury Vapor</td>
<td>400W or greater than 175W</td>
<td>72W</td>
<td>72W</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>250W or greater than 175W</td>
<td>72W</td>
<td>72W</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>150W</td>
<td>72W</td>
<td>72W</td>
</tr>
</tbody>
</table>

#### State Road/Busy Road
Type II distribution for street, Type III or V distribution for intersection

<table>
<thead>
<tr>
<th>Existing Lamp Type</th>
<th>Existing Lamp Watts</th>
<th>Prescriptive LED Upgrade Watts</th>
<th>Final LED Upgrade Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Halide</td>
<td>400W</td>
<td>108W</td>
<td>108W / 161W / 207W</td>
</tr>
<tr>
<td>High Pressure</td>
<td>250W</td>
<td>160W</td>
<td>108W / 161W / 207W</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>400W</td>
<td>215W</td>
<td>108W / 161W / 207W</td>
</tr>
</tbody>
</table>

#### 4 Sided Colonial

<table>
<thead>
<tr>
<th>Existing Lamp Type</th>
<th>Existing Lamp Watts</th>
<th>Prescriptive LED Upgrade Watts</th>
<th>Final LED Upgrade Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury Vapor</td>
<td>100W</td>
<td>52W</td>
<td>38W</td>
</tr>
<tr>
<td>Metal Halide</td>
<td>100W</td>
<td>52W</td>
<td>38W</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>100W</td>
<td>52W</td>
<td>38W</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>150W</td>
<td>75W</td>
<td>38W</td>
</tr>
</tbody>
</table>
Decorative fixtures
Prescribed to be upgraded with retrofit kit

<table>
<thead>
<tr>
<th>Existing Lamp Type</th>
<th>Existing Lamp Watts</th>
<th>Prescriptive LED Upgrade Watts</th>
<th>Final LED Upgrade Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Halide</td>
<td>175W or less</td>
<td>63W</td>
<td>63W</td>
</tr>
<tr>
<td>High Pressure Sodium</td>
<td>150W or less</td>
<td>63W</td>
<td>63W</td>
</tr>
</tbody>
</table>

*Any specific deviation away from the standard design will be noted in the line-by-line
**The design wattages are for illustration purposes and will be updated to reflect the Township’s desired manufacture once a selection is made.

Examples of the GIS Street Lighting used by ESG to implement street lighting projects.

Step 1: Raw audit data is imported into the Streetlight Portal and the utility bill reconciliation process is started. The bulk of the work is matching GPS located poles to PECO address location nomenclature on utility bill and clarifying pole/fixture ownership (HOA, private, other municipality, etc). Once this process is completed and the total fixture count is agreed upon, the prescriptive design process is applied.
Raw Audit

Map

Satellite

- Unverified Cobrahead
- Verified Cobrahead
- Unverified Column
- Unverified Aerial
- Verified Aerial
- Unverified Carelance
- Unverified Decorative
- Unverified Deck Fixture
- Ball Field
- Traffic Light
- Buildings

Pole Type & ID: Aluminum - Unique ID: 13159306 - (NA)

Photos

Pole: 

Fixture: Cobrahead - Lamp: HPS - Watts: 250W

Pole Condition: Good

Pole Location: Intersection

Fixtures per pole: 1

Arm length: 6ft

Road Type: Other

Address: Rockhill Dr, Bensalem, PA 19020, USA
Raw Audit Zoom
Step 2: Prescriptive design will classify roadway by usage and apply recommended fixtures. Design reviews with the municipality will refine roadway usage and either validate prescriptive design recommendation or alter design to reflect current roadway usage. High traffic incident area’s and under lit sections of roadway lighting is adjusted. Municipality, Provident Energy and ESG will work together to validate final design.

**Prescriptive Design**
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Prescriptive Design Zoom
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Step 3: Final design is approved and fixture selection process is finalized. Bill of Material (BOM) is generated from final design and Township spare parts stock is developed. Final project cost and saving developed.

**Final Design**
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Final Design Zoom
Photometric Analysis performed at select locations to aid in design process.
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

150 w Mercury Vapor

35 w LED
Table 1.3-1. Summary of the Proposed Lighting Fixture Quantities and Energy Savings.

<table>
<thead>
<tr>
<th>Existing Bill</th>
<th>Proposed Bill</th>
<th>Project Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PECO Fixture</strong></td>
<td><strong>Style</strong></td>
<td><strong>New Wattage</strong></td>
</tr>
<tr>
<td>100W MV</td>
<td>115</td>
<td>805</td>
</tr>
<tr>
<td>175W MV</td>
<td>191</td>
<td>362</td>
</tr>
<tr>
<td>250W MV</td>
<td>275</td>
<td>100</td>
</tr>
<tr>
<td>400W MV</td>
<td>429</td>
<td>16</td>
</tr>
<tr>
<td>70W HPS</td>
<td>94</td>
<td>1008</td>
</tr>
<tr>
<td>100W HPS</td>
<td>131</td>
<td>1</td>
</tr>
<tr>
<td>150W HPS</td>
<td>192</td>
<td>50</td>
</tr>
<tr>
<td>250W HPS</td>
<td>294</td>
<td>222</td>
</tr>
<tr>
<td>400W HPS</td>
<td>450</td>
<td>75</td>
</tr>
<tr>
<td>100W MH</td>
<td>131</td>
<td>635</td>
</tr>
<tr>
<td>175W MH</td>
<td>192</td>
<td>333</td>
</tr>
<tr>
<td>250W MH</td>
<td>294</td>
<td>244</td>
</tr>
<tr>
<td>400W MH</td>
<td>450</td>
<td>192</td>
</tr>
<tr>
<td>210W LED</td>
<td>210</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total - Cobraheads | 4046 | 3,089,954 |
| Total - Decoratives | 1022 | 619,980 |

| Project Total Locations | 5068 | 3,709,934 |
| Service Location Distribution | $430,577 |

Note: As per RFP the center fixtures are not included in the recommended package of measures.
ECM 1 Add Alternate 2: Street Lighting Controls
ESG recommends a wireless controls systems as an option to the street lighting retrofit. Some of the benefit of the systems are as follows:

**Smart City IoT platform**
- Telensa’s network is ready for other IoT applications; future proof your street lighting infrastructure

**Deployment leader**
- More deployments in more countries – 1 million devices
- More lights managed over a wider area

**Best wireless for lighting**
- Range: Mesh needs 3x more base stations
- Price: 100x less than cellular

**Deployment Flexibility**
- Fast wide-area coverage
- No need for line of sight
- Unlike mesh, can start in multiple locations

**Sophisticated Control**
- Unrivalled range of program controls
- Add sensors to lights for weather and traffic

**Fixture independent**
- Works with any type of fixture from any vendor
- Works with LED and legacy luminaires

### 1.3.1 Assumptions & Exclusions
1. Scope does not include correction of existing code violations or old wiring issues that are encountered during this lighting retrofit. We will bring code violations and system deficiencies we encounter in the scope of work to your attention. Any work that addresses code deficiency, not expressly included in the scope, is excluded.
2. Waste handling and recycling and storage containers were incorporated into the scope.
3. Scope does not include work to be performed in areas containing asbestos or other hazmat.

### 1.3.2 Expected Code Impact
1. Lighting level “standards” are either IESNA-based or client agency-defined.

### 1.4 Savings Impact
Electric demand and energy reduction from LED upgrade. Reduced maintenance savings due to rated life of new LED fixtures and manufacturers warranty.
1.5 Savings Methodology

The lighting electric energy savings follows the methodology presented below.

**Lighting Upgrades**

\[
EE = \sum_{i=1}^{k} (kW_i \times n_i \times h_i)
\]

\[
EP = \sum_{j=1}^{l} (kW_j \times n_j \times h_j)
\]

\[
ES = EE - EP
\]

\[
CS = ES \times EUR
\]

Where,

- \(EE\) = Annual energy use of existing system
- \(EP\) = Annual energy use of proposed system
- \(ES\) = Annual energy savings
- \(kW\) = Electric demand (kW) per fixture, based on manufacturer’s rating & validated through sample wattage measurements
- \(n\) = Quantity of fixtures determined from field surveys
- \(h\) = Annual hours of burn time based on field audit and sample logging
- \(CS\) = Annual cost savings
- \(EUR\) = Electric unit utility rate, determined from baseline utility rate analysis

Subscript “\(i\)” is for baseline (existing) types of fixtures and “\(j\)” for proposed types of units.

**Assumptions:**

1. Annual burn-time hours represent PECO established hours of operation

1.6 Rebates & Incentives

Act 129 Electric Company Energy Efficiency Programs and Rebates.

1.7 Physical Changes

1. New LED Cobra Heads
2. New Colonial street Lighting fixtures.

1.8 Utility Interruptions

No utility interruption anticipated.
1.9 **Expected Maintenance Requirements**

Owing to the LED’s long service life, any maintenance associated with the lighting system is greatly reduced. The LED system will require the typical visual checkup and lamp replacement as needed.

Operations and Maintenance (O&M) Savings for LED street lights are based on costs incurred by the township to repair and replace existing fixtures (including cobra heads and decorative fixtures). Maintenance records will be collected and reviewed by ESG for a 12 to 24 month period. The cost for repairing and replacing existing fixtures during this time will be averaged to annual costs (shown in the Repairs and Maintenance Column in table below), excluding street lighting expenses that will not be impacted by the project (i.e. painting poles, installing new fixtures and knockdowns). The Township and ESG then will agreed to the cost for repairing and replacing existing fixtures and determine the initial reduction expected in project years 1-10 and the longer term reduction in project years 11-20 (at a lower rate to account for possible replacements needed for photocells and drivers that might occur during years 10-20). O&M Savings are escalated at 3% each year. The table will be completed during the investment grade audit of the street lights to determine the appropriate O&M savings.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fixed Maintenance Contract</th>
<th>Repairs &amp; Maintenance</th>
<th>Knockdowns and other excluded Maint. Costs</th>
<th>In-House Maintenance Related Materials</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2019</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Year 2020</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Average</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Agreed Savings % (Years 1-10)</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>80%</td>
<td>0%</td>
</tr>
<tr>
<td>Agreed Savings % (Years 11-20)</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td>Savings $ (Years 1-10)</td>
<td>$0.00</td>
<td>$0</td>
<td>$0.00</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Savings $ (Years 11-20)</td>
<td>$0.00</td>
<td>$0</td>
<td>$0.00</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

1.10 **Typical Warranty**

Typical LED material warranty is 10 years, with expected LED lamp service life of 100,000 hours or longer. Standard labor or workmanship warranty is one year. Both the labor and the material warranties begin at the start of beneficial use or at substantial completion, whichever is earlier.

1.11 **Expected Life**

Most of the LED lamps are rated for 100,000 hours.
2 ECM: Lighting Upgrades, Interior, Exterior (ECM 2 Other Lighting)

2.1 Description

The measure proposes upgrading fluorescent and other lighting technologies with more efficient Light Emitting Diode (LED) technology. The measure discussed in this section applies to building interior and exterior lighting.

**Applicable Sites: Exterior**
- Ludington Library – replace parking lot metal halides with LED
- Bala Cynwyd Library – replace metal halides with LED
- Koegel Complex – replace HPS wallpacks with LED
- Vernon Young – replace playground, stadium, walkway and Ardmore Ave lighting with LED
- Ardmore Ave Pool Complex – replace metal halide shoe box fixtures and wallpacks with LED
- Belmont Hills Pool Complex – replace hockey court stadium lighting with LED, replace metal halide shoebox fixtures with LED, replace CFLs with LED
- Warner Ave – replace metal halide decorative fixtures with LED
- Bryn Mawr – replace metal halide decorative fixtures with LED

**Applicable Sites: Interior**
- Ludington Library – “atrium” area fluorescent lighting to be replaced with long-lasting LED fixtures due to inaccessibility issues for maintenance staff
- Bryn Mawr Community Center – upgrade various fluorescent and incandescent lighting to LED
- Koegel Complex – replace remaining metal halides with LED fixtures
- Penn Wynne Library – upgrade remaining T-12 lighting to LED

2.2 Existing Conditions

The existing lighting system consists primarily of T8 Fluorescent lighting systems along with compact fluorescent lamps for use in recessed interior fixtures and exterior wall pack fixtures. There are high bay fixtures located in shop area that use fluorescent lighting technology as well.

Table 2.2-1 is the assumed lighting hours of operation (as stated in the RFP) for the purpose of calculating existing usage and savings for this ECM. Figure 2.2-2 shows quantity and usage.
Table 2.2-1. Assumed Lighting Hours of Operation.

<table>
<thead>
<tr>
<th>Space Classification</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courtroom</td>
<td>1800</td>
</tr>
<tr>
<td>Office</td>
<td>2500</td>
</tr>
<tr>
<td>Corridor/stairwell</td>
<td>3800</td>
</tr>
<tr>
<td>Common space</td>
<td>3000</td>
</tr>
<tr>
<td>Restroom</td>
<td>3900</td>
</tr>
<tr>
<td>Gym</td>
<td>2600</td>
</tr>
<tr>
<td>Locker room</td>
<td>2400</td>
</tr>
<tr>
<td>Library</td>
<td>2800</td>
</tr>
<tr>
<td>Janitor close</td>
<td>800</td>
</tr>
<tr>
<td>Cafeteria</td>
<td>3200</td>
</tr>
<tr>
<td>Kitchen</td>
<td>3000</td>
</tr>
<tr>
<td>Exit Sign 8760</td>
<td>8760</td>
</tr>
<tr>
<td>Storage/service areas</td>
<td>500</td>
</tr>
<tr>
<td>Exterior Lighting</td>
<td>4380</td>
</tr>
<tr>
<td>Street Lighting</td>
<td>4380</td>
</tr>
<tr>
<td>Multi-purpose area</td>
<td>2600</td>
</tr>
<tr>
<td>Garage</td>
<td>3000</td>
</tr>
<tr>
<td>Prison cellblock</td>
<td>4000</td>
</tr>
<tr>
<td>Inmate cell</td>
<td>2000</td>
</tr>
</tbody>
</table>

Table 2.2-2. Lighting Fixtures Quantities/Usage.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Existing Quantity</th>
<th>Existing kW</th>
<th>Existing kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>33</td>
<td>5.4</td>
<td>23858</td>
</tr>
<tr>
<td>Bala Cynwyd Library</td>
<td>16</td>
<td>2</td>
<td>8909</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>54</td>
<td>3.9</td>
<td>12891</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>86</td>
<td>6.2</td>
<td>12526</td>
</tr>
<tr>
<td>Domestic Animal Detention Center</td>
<td>616</td>
<td>130</td>
<td>375187</td>
</tr>
<tr>
<td>(Koegel Complex)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ludington Library</td>
<td>793</td>
<td>49.4</td>
<td>170013</td>
</tr>
<tr>
<td>Vernon Young</td>
<td>38</td>
<td>29.4</td>
<td>129175</td>
</tr>
<tr>
<td>Warner Ave (Park)</td>
<td>5</td>
<td>.5</td>
<td>3832</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>1641</strong></td>
<td><strong>226.8</strong></td>
<td><strong>736391</strong></td>
</tr>
</tbody>
</table>
2.3 Proposed Scope

LED technology, the latest in lighting technology advancement, offers high-quality lighting that is effective and efficient. The longevity of the technology reduces the maintenance burden on the building staff, making LEDs highly desirable and an expedient choice.

Site Observations

Ardmore Ave Pool Complex - Exterior
New LED wallpacks are recommended to replace the existing HID wallpacks that ring the pool house and community center.

Pole-mounted LED area luminaires are recommended as one-for-one replacements for the existing HID shoebox fixtures that are mounted in pairs around the pool deck area.

Bala Cynwyd Library - Exterior
New pole-mounted LED area lights are recommended as replacements for the existing HID shoebox fixtures that illuminate the parking lot.

All of the building-mounted lighting is already LED.
The French International School was not included in this scope of work.

**Belmont Hills Community Center**

This is an older facility, but it appears that the interior lighting has been updated fairly recently. Most areas had hard ceilings, which likely limited the options when selecting the new lighting fixtures. In most of the common areas, vapor-tite luminaires were surface-mounted with EMT connecting the feeds between fixtures. Being that the luminaires are in very good condition, the optimal solution is to retrofit them with line voltage LED tubes. Unless new ceilings are part of the consideration, replacing the luminaires with new LED models will offer only slight aesthetic improvements without any appreciable increases in energy or maintenance savings.

The parking lot and elevated walkways are illuminated by a hodgepodge of pole-mounted luminaires. New LED luminaires are recommended as one-for-one replacements.
Belmont Hills Pool Complex - Exterior

Pole-mounted LED area luminaires are recommended as one-for-one replacements for the existing HID shoebox fixtures that are mounted in trios around the pool deck and play areas.

The pole lighting for the hockey rink appears to have been recently updated, but the area lights are equipped with inefficient metal halide components. Each head is equipped with a directional reflector to drive the light towards its intended target. A LED upgrade solution using new area light heads is included.

Bryn Mawr Community Center

This is another older facility, but unlike Belmont Hills, the lighting systems are aged and in fairly poor condition. There were a few LED tube retrofits installed by township maintenance personnel as fluorescent ballasts failed. New linear LED luminaires are recommended to replace the existing fluorescent fixtures. To create a consistent look throughout the building, new luminaires are also included in the scope to replace the handful of luminaires that are currently equipped with LED tubes.

New LED luminaires are scheduled to replace the ceiling and wall-mounted incandescent fixtures.

The exterior lighting is already LED.

Koegel Complex

The Koegel Complex represents the greatest opportunity for energy savings, outside of the street lighting component.
New LED high bay luminaires with embedded occupancy sensors are included as replacements for both the HID and linear fluorescent high bay fixtures that are found throughout the complex.

Roughly 40% of the T8 fluorescent lamps in the Public Works facility have been replaced with LED tubes. Our plan is to continue this type of retrofit for the remainder of the fluorescent luminaires.

The lighting in the Refuse & Recycling facility is in fairly poor condition. New LED luminaires are recommended throughout with the exception of the Garbage Pit that is no longer used. Most of the lighting in the pit area is already burned out, as access is extremely difficult. Any upgrades would be labor intensive.

We did not have access to the Animal Detention Center during our site visit. Fixture counts are estimates. The same goes for the shed at the rear of the building.

Much of the exterior lighting is still equipped with HID components. New LED luminaires of similar style and function are recommended as replacements.

**Ludington Library**

This is another facility that received a complete renovation, which included lighting, over the past 10 years. The luminaires throughout the interior are in excellent condition. Some have been retrofit with line voltage LED tubes, as fluorescent ballasts failed. Both the suspended direct-indirect luminaires and recessed direct-indirect luminaires will be retrofit with line voltage LED tubes.

There are recessed downlights throughout, where single piece LED retrofits are recommended. The existing can will be re-used.

New LED luminaires are scheduled to replace the various exterior HID fixtures, such as the bollards, floodlights, and pole-mounted shoebox fixtures. The exceptions are the in-ground floodlights. A small portion of them has already been retrofit with LED par lamps. Our plan is to continue this upgrade path to the remainder of the fixtures. New in-ground LED floods were evaluated, but eliminated from consideration due to the high material cost and labor-intensive installation. The lighting on the two main atria entrances is already LED.

**Penn Wynne Library**

All interior and exterior lighting is LED.
Vernon Young Memorial Park
One-for-one replacements are all existing HID fixtures are included. This includes the pole-top lighting in the park, as well as the high mast lighting for the basketball, tennis and volleyball courts.

Warner Ave Park
Based on guidance from maintenance personnel, it is assumed that these luminaires have already been retrofit with LED kits.
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Interior Lighting Upgrades – Fluorescent Fixture Retrofit and LED Upgrades
ESG surveyed the buildings in this scope and discovered buildings have a combination of fixtures with compact fluorescent lamps and T8 lamps with electronic ballasts. All of the fixtures will be converted to LED technology. Refer to Table 2.3-1 & Table 2.3-2 for a summary of the proposed lighting fixture quantities and energy savings.

Table 2.3-1. Summary of the Proposed Interior Lighting Fixture Quantities and Energy Savings.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>ECM</th>
<th>Proposed Quantity</th>
<th>kW Saved (monthly)</th>
<th>kWh Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryn Mawr Community Center</td>
<td>Interior LED Lighting</td>
<td>77</td>
<td>3.72</td>
<td>6484</td>
</tr>
<tr>
<td>Domestic Animal Detention Center (Koegel Complex)</td>
<td>Interior LED Lighting - HID</td>
<td>173</td>
<td>42.8</td>
<td>116340</td>
</tr>
<tr>
<td>Domestic Animal Detention Center (Koegel Complex)</td>
<td>Interior LED Lighting</td>
<td>384</td>
<td>25</td>
<td>86856</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>Interior LED Lighting</td>
<td>710</td>
<td>22</td>
<td>66240</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>LED Atrium Lighting</td>
<td>72</td>
<td>0.8</td>
<td>3100</td>
</tr>
<tr>
<td>Penn Wynne Library</td>
<td>Interior LED Lighting - Completed</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>1032</td>
<td>69.32</td>
<td>192164</td>
</tr>
</tbody>
</table>

Exterior Lighting Upgrades
As part of this project, the outdoor lighting has been assessed for effectiveness and efficiency. Exterior lighting consists of primarily wall-pack and recessed can fixtures with compact fluorescent, incandescent, and High-Intensity Discharge (HID) lamps as well as 15-35 foot post-top and pole-mounted fixtures with HID lamps. ESG has considered options for outdoor lighting with new LED fixtures and lamps for certain fixture types. These retrofits represent newer technology, extremely long lamp life, and significant energy and maintenance cost savings for the township. The cooler color temperature of these LED lights offer a superior quality of light and are preferred by most security professionals for the purpose of better identification, better color rendering, and a perceived safer atmosphere. Table 2.3-2 has a summary of the proposed lighting fixture quantities and energy savings.
Table 2.3-2. Summary of Proposed Exterior Lighting Fixture Quantities and Energy Savings.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>ECM</th>
<th>Proposed Quantity</th>
<th>kW Saved (monthly)</th>
<th>kWh Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>LED Site Lighting</td>
<td>33</td>
<td>2.88</td>
<td>12632</td>
</tr>
<tr>
<td>Bala Cynwyd Library</td>
<td>LED Site Lighting</td>
<td>16</td>
<td>1.24</td>
<td>5414</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>LED Site Lighting</td>
<td>42</td>
<td>4.2</td>
<td>18698</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>LED Site Lighting - Completed</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Domestic Animal Detention Center (Koegel Complex)</td>
<td>LED Wallpacks</td>
<td>59</td>
<td>8.8</td>
<td>35249</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>LED Parking Lot Lighting</td>
<td>11</td>
<td>2.2</td>
<td>9667</td>
</tr>
<tr>
<td>Vernon Young</td>
<td>LED Site Lighting</td>
<td>9</td>
<td>1.1</td>
<td>5164</td>
</tr>
<tr>
<td>Warner Ave (Park)</td>
<td>LED Site Lighting</td>
<td>5</td>
<td>0.5</td>
<td>2190</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>175</strong></td>
<td><strong>20.92</strong></td>
<td><strong>89014</strong></td>
</tr>
</tbody>
</table>

There are existing fixtures that are not scheduled for replacement or retrofit as part of this proposal. The quantity per site are listed below along with the justification and budgeted value. These items can be reconsidered and included in a final project if Lower Merion Township (LMT) chooses.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Location</th>
<th>Budget Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>Hockey Rink</td>
<td>$15,000</td>
<td>Fixtures are in like new condition. Hours of operation are minimal. High Payback</td>
</tr>
<tr>
<td>Luddington Library</td>
<td>All Areas</td>
<td>$20,000</td>
<td>Remove the downlight retrofits. Minimal savings, and 40% of them have battery backups installed.</td>
</tr>
<tr>
<td>Vernon Young Park</td>
<td>Courts</td>
<td>$85,000</td>
<td>New LED Sportslighters are expensive. Hours of operation are minimal. High Payback</td>
</tr>
</tbody>
</table>
2.3.1 Assumptions & Exclusions

1. Scope does not include correction of existing code violations or old wiring issues that are encountered during this lighting retrofit. We will bring code violations and system deficiencies we encounter in the scope of work to your attention. Any work that addresses code deficiency, not expressly included in the scope, is excluded.

2. Waste handling and recycling and storage containers were incorporated into the scope.

3. Non-PCB-containing ballasts, if encountered during construction, will incur an added price for proper disposal. All lamps and ballasts will be legally disposed through a licensed hazmat company.

4. Scope does not include work to be performed in areas containing asbestos or other hazmat.

5. No new lenses will be provided for broken lens only, unless new fixtures are installed. Broken socket replacement is included.

2.3.2 Expected Code Impact

1. State codes may require bringing emergency or egress lighting to current code.

2. Lighting level “standards” are either IESNA-based or client agency-defined.

2.4 Savings Impact

Electric demand and energy reduction from LED upgrade. Also, the internal heat generation is substantially lower, reducing the cooling load. However, the reduced heat generation could increase the heating energy required, offsetting the gain from cooling load reduction.
2.5 Savings Methodology

The lighting electric energy savings follow the methodology presented below.

\[
\begin{align*}
E_E &= \sum_{i=1}^{k}(\text{kW}_i \times n_i \times h_i) \\
E_P &= \sum_{j=1}^{l}(\text{kW}_j \times n_j \times h_j) \\
E_S &= E_E - E_P \\
C_S &= E_S \times EUR
\end{align*}
\]

Where,

- \(E_E\) = Annual energy use of existing system
- \(E_P\) = Annual energy use of proposed system
- \(E_S\) = Annual energy savings
- \(\text{kW}\) = Electric demand (kW) per fixture, based on manufacturer’s rating & validated through sample wattage measurements
- \(n\) = Quantity of fixtures determined from field surveys
- \(h\) = Annual hours of burn time based on field audit and sample logging
- \(C_S\) = Annual cost savings
- \(EUR\) = Electric unit utility rate, determined from baseline utility rate analysis

Subscript “i” is for baseline (existing) types of fixtures and “j” for proposed types of units.

Assumptions:

(1) Annual burn-time hours represent baseline and proposed use.
(2) Existing lights and ballasts are replaced regularly, so all lights are regularly lit.
(3) The space use and type remain the same for the baseline and the proposed cases.

2.6 Rebates & Incentives

Act 129 Electric Company Energy Efficiency Programs and Rebates.

2.7 Physical Changes

1. New LED lamps.
2. Lighting fixtures rewired for LED tubes.
2.8 Utility Interruptions
No utility interruption anticipated.

2.9 Expected Maintenance Requirements
Owing to the LED’s long service life, any maintenance associated with the lighting system is greatly reduced. The LED system will require the typical visual checkup and lamp replacement as needed.

2.10 Typical Warranty
Typical LED material warranty is 5 to 10 years, with expected LED lamp service life of 70,000 hours or longer. Standard labor or workmanship warranty is one year. Both the labor and the material warranties begin at the start of beneficial use or at substantial completion, whichever is earlier.

2.11 Expected Life
Most of the LED lamps are rated for 70,000 hours; drivers for 50,000 hours. ESG has included a 10-year manufacturer’s warranty for all LED tubes.

2.12 Occupant Comfort
The new lighting is expected to provide improved lighting levels and light distribution which should result in improved occupant comfort.
3 ECM: Replace Boilers (ECM 3)

3.1 Description

This measure proposes to replace existing Hot Water (HW) boilers with new high-efficiency, condensing HW boilers. As these types of equipment age, they become less efficient due to general wear and age. Burner controls become worn and do not reproduce control sequences as well. Scale accumulates and insulates the tubes and heat exchange surfaces, reducing efficiency. Also, more efficient equipment is now available than was manufactured in the past, increasing the difference between the operating costs of older equipment as compared to newer equipment.

The measure discussed in this section applies to the building’s heating hot water system.

Applicable Sites:
- Ardmore Library
- Belmont Community Center
- Bryn Mawr Community Center
- Domestic Animal Detention Center (Koegel Complex)
- Ludington Library
- Public Safety Building
- Township Administration Building

3.2 Existing Conditions

Table 3.2-1. Existing Boiler Plant Details.

<table>
<thead>
<tr>
<th>QTY</th>
<th>Facility</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Type(a)</th>
<th>Output(b) MBH</th>
<th>Eff(c)</th>
<th>Serves</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ardmore Library</td>
<td>Weil McLain</td>
<td>78</td>
<td>HW, NC</td>
<td>714</td>
<td>75%</td>
<td>Space heating</td>
<td>One boiler</td>
</tr>
<tr>
<td>1</td>
<td>Belmont Community Center</td>
<td>Weil McLain</td>
<td>78</td>
<td>HW, NC</td>
<td>480</td>
<td>75%</td>
<td>Space heating</td>
<td>Boiler Shell / cabinet rusting</td>
</tr>
<tr>
<td>1</td>
<td>Bryn Mawr Community Center</td>
<td>Weil McLain</td>
<td>788</td>
<td>HW, NC</td>
<td>1632</td>
<td>75%</td>
<td>Space heating</td>
<td>One boiler</td>
</tr>
<tr>
<td>1</td>
<td>Domestic Animal Detention Center (Koegel Complex)</td>
<td>Lennox</td>
<td>Elite Series</td>
<td>Furnace</td>
<td>100</td>
<td>75%</td>
<td>Space heating</td>
<td>Furnace System</td>
</tr>
<tr>
<td>1</td>
<td>Ludington Library</td>
<td>Weil McLain</td>
<td>78</td>
<td>HW, NC</td>
<td>1463</td>
<td>75%</td>
<td>Space heating</td>
<td>One boiler</td>
</tr>
<tr>
<td>1</td>
<td>Public Safety Building</td>
<td>Smith</td>
<td>19A</td>
<td>HW, NC</td>
<td>1342</td>
<td>75%</td>
<td>Space heating</td>
<td>One boiler</td>
</tr>
<tr>
<td>2</td>
<td>Township Administration Building</td>
<td>Weil McLain / Smith</td>
<td>78 / 19A</td>
<td>HW, NC</td>
<td>1342</td>
<td>75%</td>
<td>Space heating</td>
<td>Two Boilers</td>
</tr>
</tbody>
</table>

(a) HW is Hot Water, NC is non-condensing
(b) MBH is 1000 BTUs/hr
(c) $\eta$ denotes estimated combustion efficiency value at 100% firing

Figure 1 - Township Building
Figure 2 – Public Safety
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Figure 3 – Ludington Library

Figure 4 – Ardmore Library
3.3 Proposed Scope

The existing boilers have experienced maintenance issues and/or are past their expected service life. In addition, the existing boilers are inefficient. Taking into consideration these factors, ESG proposes the approach detailed in Table 3.3-1.

We propose Hot Water (HW) boilers, as these units can operate more efficiently in condensing mode during low-demand period. The greater efficiency in condensing mode is achieved by extracting the latent heat of vaporization from water vapor in the flue gases. Furthermore, the burners in the existing boilers have relatively poor turndown, which results in higher standby losses. The proposed boilers, with higher turndown, reduce standby losses, resulting in additional fuel savings. Our proposed approach preserves the existing redundancy of the HW units.

Table 3.3-1. Proposed boiler plant details.

<table>
<thead>
<tr>
<th>QTY</th>
<th>Facility</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Type(^{(a)})</th>
<th>Output(^{(b)}) MBH</th>
<th>Eff (^{(c)})</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ardmore Library</td>
<td>Weil McLain</td>
<td>780</td>
<td>HW</td>
<td>753</td>
<td>83.2%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Belmont Community Center</td>
<td>Weil McLain</td>
<td>480</td>
<td>HW</td>
<td>344</td>
<td>83.2%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bryn Maw Community Center</td>
<td>Weil McLain</td>
<td>480</td>
<td>HW</td>
<td>344</td>
<td>83.2%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Domestic Animal Detention Center</td>
<td>Lennox</td>
<td>G32</td>
<td>Furnace</td>
<td>100</td>
<td>94%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ludington Library</td>
<td>Weil McLain</td>
<td>1280</td>
<td>HW, NC</td>
<td>1172</td>
<td>83.2%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Public Safety Building</td>
<td>Smith</td>
<td>19A-8</td>
<td>HW</td>
<td>924</td>
<td>83.2%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Township Administration Building</td>
<td>Smith</td>
<td>19A-8</td>
<td>HW</td>
<td>3,000</td>
<td>83.2%</td>
<td></td>
</tr>
</tbody>
</table>

\(^{(a)}\) C denotes condensing boiler.  
\(^{(b)}\) Eff denotes estimated combustion efficiency value at 100% firing.

Note: ESG considered the installation of condensing boiler(s) as an option for each of the facilities listed above. The premium for installing condensing boilers did not out weight the additional savings achieved by their installation. The premium cost is budgeted at $130k, with an additional savings of $4k, result in a 32.5 payback.
The boiler plant scope includes the following:

1. Removal and disposal of the existing boiler(s).
2. Furnish and install new boiler(s).
3. Install new hot water and boiler feed water pump(s).
4. Install flue stack appropriate for condensing boilers.
5. Install an approved method for draining the condensate from the flue gases.
6. Connect the new boiler(s) to the new boiler stack, supply and return lines, make-up water, boiler drain (blow-down) and fuel lines.
7. Complete necessary piping modifications, including appropriate pipe support for the new boiler(s).
8. Provide water treatment (if applicable).
9. Complete electrical connections for the boiler(s), pump(s), and controls.
10. Upgrade/reuse existing boiler safety shutoff(s).
11. New boiler pad(s), unless the existing can be reused.
12. Insulate piping, place appropriate labels.
13. Connect new boiler(s) to existing energy management and monitoring system (where applicable).
14. Scope includes turnkey installation and incorporates permitting and applicable prevailing wages.
15. Perform boiler startup, testing, and complete associated documentation.

### 3.3.1 Assumptions & Exclusions

- The existing piping, valves, expansion tanks, and other appurtenances were visually examined at the time of the field audit and were found to be in adequate working condition and assessed to be suitable for reuse.
- Excludes hazmat abatement.
- The existing water treatment has been assessed as being adequate and will be retained for serving the new boilers.
- The existing distribution system outside the boiler room was not evaluated and is assumed to be in adequate working condition.
- Boiler sizing is based on the existing installed capacity for the purpose of this RFP response, once the projects are selected ESG will complete a detailed load analysis and the final boiler selection will based on a load analysis and customer preferred manufacturer.
3.3.2 Expected Code Impact
The following are the normally expected code impacts:

1. Selected boilers must meet the local air-quality standards and may have to go through appropriate air permitting.
2. Minimum efficiency based on applicable energy code.
3. Existing code violations.

3.4 Savings Impact
The increase in combustion efficiency of the proposed boiler and the reduction in standby losses yield fuel savings. The new boilers reduce the maintenance burden and obviate the need to replace the aging assets (capital avoidance) in the next 15 years.

3.5 Savings Methodology
The following methodology, equations, and assumptions apply to the utility savings from the measure.
3.6 Rebates and Incentives

UGI Utility Rebate Natural Gas Program.

3.7 Physical Changes

1. The following are the key physical changes: The new units will replace the existing HW boilers.
2. The existing flue stack for the HW boilers will be abandoned in place. New stacks appropriate for HW condensing units will be installed.
3. Boiler footprint will be reduced.

---

Boiler Replacement

\[
\begin{align*}
E_E &= \sum_{i=1}^{9760} \left( \frac{Q_i}{\eta_E} \right) \\
E_P &= \sum_{i=1}^{9760} \left( \frac{Q_i}{\eta_P} \right) \\
E_S &= E_E - E_P \\
C_S &= E_S \times FUR
\end{align*}
\]

Where,

- \( E_E \) = Annual energy (fuel) use of existing system
- \( E_P \) = Annual energy use of proposed system
- \( E_S \) = Annual energy savings
- \( C_S \) = Annual cost savings
- \( Q_i \) = Hourly heating demand, modeled as a linear fit of OA DBT (Dry-Bulb Temperature), with a cut-off temperature above which there is no heating
- \( \eta \) = Combustion efficiency of heating system based on field data, manufacturer's rating or snapshot measurements
- \( FUR \) = Fuel unit utility rate, determined from baseline utility rate analysis

Subscript “i” denotes the number of hours in a year. Subscripts “E” and “P” stand for Existing and Proposed system, respectively.

**Key Assumptions:**

1. Combustion efficiency values are relatively constant for the typical loading of boilers.
2. The hourly heating demand of the building is a linear function of the OA DBT.
3. The TMY-3 weather data from the nearest weather station accurately represents the site conditions.
4. The baseline utility use and associated weather data approximate the TMY-3 (Typical Meteorological Year) data for valid comparison.
3.8 Utility Interruptions
No utility interruptions anticipated. Work to be performed in the summer months.

3.9 Expected Maintenance Requirements
Preventive Maintenance (PM) for the new units will be similar to that for the existing boilers. The Operation and Maintenance (O&M) manual will include the PM tasks and the recommended frequency for the new units.

3.10 Typical Warranty
Boiler manufacturer’s warranty on material is typically 5 to 10 years, with applicable terms and conditions. The labor or workmanship warranty is one year from the start of the beneficial use of the boilers or installation of acceptance, whichever comes first.

<table>
<thead>
<tr>
<th>Description</th>
<th>Warranty Period(a)</th>
<th>Post-Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler System, Material</td>
<td>ESG</td>
<td>OEM(b)</td>
</tr>
<tr>
<td>Boiler System, Workmanship (Labor)</td>
<td>ESG</td>
<td>Customer</td>
</tr>
</tbody>
</table>

(a) Typical warranty period is 1 year after the start of beneficial use or substantial completion of the measure, whichever is earlier.
(b) Original Equipment Manufacturer.

3.11 Expected Life
Based on American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the expected service life of condensing HW boilers is 15 years.

3.12 Occupant Comfort
The new boiler(s) are capable of providing enhanced control of heating water temperatures, which should result in improved occupant comfort.
4 **ECM: Replace Chillers (ECM 4)**

4.1 **Description**

The measure proposes to replace existing air-cooled and water-cooled chillers with new, packaged air-cooled chillers. More efficient equipment is now available than was manufactured in the past, increasing the difference between the operating costs of older equipment as compared to newer equipment.

**Applicable Site:**
- Ludington Library

4.2 **Existing Conditions**

The chillers and condensing units at the Ludington Library have reached the end of useful life and although well maintained are inefficient units compared to today’s current technology.

### Table 4.2-1. Existing Chiller Plant Details.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Manufacturer</th>
<th>QTY</th>
<th>Model</th>
<th>Type(a)</th>
<th>Size Tons</th>
<th>kW/ton(b)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ludington Library</td>
<td>McQuay</td>
<td>1</td>
<td>WGZ130CW27-ER10</td>
<td>AC</td>
<td>130</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Ludington Library</td>
<td>BAC</td>
<td>1</td>
<td>BAC</td>
<td>Tower</td>
<td>130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) AC = air-cooled; WC = water-cooled, etc.

(b) Estimated
4.3. Proposed Scope

The existing chillers (and cooling tower(s), as shown in Table 4.2-1, are at or near the end of their expected service life and are inefficient. Taking into consideration these factors, ESG proposes the approach detailed in the following Table 4.3-1.

We propose packaged, air-cooled chillers as these units operate more efficiently than currently installed technology. The chiller plant scope includes the following:

1. Removal and disposal of the existing water-cooled chiller (and associated cooling tower for the water-cooled chiller) listed in Table 5.2-1.
2. Furnish and install new chiller(s) as listed in Table 5.3-1.
3. Remove existing chilled water pumps and motors.
4. Install new chilled water pump(s) (refer to motor upgrade ECM), premium efficiency, inverter-duty ready motors, with appropriately sized VFDs.
5. Provide new chilled water piping from new chiller to new chilled water pumps.
6. Reuse remaining existing infrastructure such as piping and valves.
7. Complete necessary piping modifications, including appropriate pipe support for the new chiller(s).
8. Complete electrical connections for the chiller(s), pump(s) and controls.
9. Upgrade/reuse existing chiller safeties, including applicable Self-Contained Breathing Apparatus (SCBAs).
10. New chiller pad(s), unless the existing can be reused.
11. Provide vapor-barrier insulation on chilled water distribution piping and place appropriate labels.
12. Scope includes turnkey installation and incorporates permitting and applicable prevailing wages.
13. Perform chiller startup, testing and complete associated documentation.

Table 4.3-1. Proposed chiller plant details.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Manufacturer</th>
<th>QTY</th>
<th>Model</th>
<th>Type(a)</th>
<th>Size</th>
<th>kW/ton(b)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ludington Library</td>
<td>McQuay</td>
<td>1</td>
<td>Air Cooled</td>
<td>AC</td>
<td>130</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

(a) WC = water-cooled
(b) Based on manufacturer’s data
4.3.1 Assumptions & Exclusions

1. The existing distribution piping, valves, and other appurtenances were visually examined at the time of the field audit and were found to be in adequate working condition and assessed to be suitable for reuse.

2. Excludes hazmat abatement.

3. Excludes premium time.

4. The existing distribution system throughout the complex was not evaluated and assumed to be in adequate working condition.
   • Chiller sizing is based on the existing installed capacity for the purpose of this RFP response, once the projects are selected ESG will complete a detailed load analysis and the final chiller selection will be based on a load analysis and customer preferred manufacturer.

4.3.2 Expected Code Impact

The following are the normally expected code impacts:

1. At a minimum, new chiller efficiency must meet energy code requirements (ASHRAE 90.1 or State codes).
2. Chiller/boiler separation.
3. Refrigerant leak detection and alarm.
4. Chiller room ventilation for both refrigerant leak system as well as dissipation of heat gains (open drive chillers such as York may have higher heat losses of the compressor).
5. Existing code deficiencies, depending on scope overlap.

4.4 Savings Impact

The increase in chilled water system efficiency from the proposed chiller yield energy savings. The new chillers reduce the maintenance burden and obviate the need to replace the aging assets (capital avoidance) in the next 20 years.

4.5 Savings Methodology

The following methodology, equations, and assumptions apply to the utility savings from the measure.
### Chiller Replacement

\[
\begin{align*}
E_E &= \sum_{i=1}^{8760} \left[ Q_{i,c} \div \text{COP}_E \right] \\
E_P &= \sum_{j=1}^{8760} \left[ Q_{j,c} \div \text{COP}_P \right] \\
E_S &= E_E \cdot E_P \\
C_S &= E_S \times \text{EUR}
\end{align*}
\]

Where,

- \(E_E\) = Annual energy use of existing system
- \(E_P\) = Annual energy use of proposed system
- \(E_S\) = Annual energy savings
- \(C_S\) = Annual cost savings
- \(Q_{i,c}\) = Hourly cooling demand, modeled as a linear fit of OA DBT, with a cut-off temperature below which there is no mechanical cooling
- \(\text{COP}\) = Coefficient of performance of the cooling system based on manufacturer’s rating
- \(\text{EUR}\) = Electric unit utility rate, determined from baseline utility rate analysis

Subscript “\(i\)” denotes the number of hours in a year. Subscripts “E” and “P” stand for Existing and Proposed system, respectively.

**Assumptions:**

1. COP values are relatively constant for the typical loading of chillers.
2. The hourly cooling demand of the building is a linear function of the OA DBT.
3. The TMY-3 weather data from the nearest weather station accurately represents the site conditions.
4. The baseline utility use and associated weather data approximate the TMY-3 data

### 4.6 Rebates & Incentives

Act 129 Electric Company Energy Efficiency Programs and Rebates.

### 4.7 Physical Changes

The following are the key physical changes:

1. The new units will replace the existing air- or water-cooled chillers.
2. New chilled water pumps and piping from the new air-cooled chillers to new chilled water pumps.
4.8 Utility Interruptions
Cooling to portions of buildings may be impacted for brief periods. Chiller changeout will be scheduled during colder months to reduce utility interruption.

4.9 Expected Maintenance Requirements
Preventive Maintenance (PM) for the new units will be mostly similar to that for the existing chillers. The Operation and Maintenance (O&M) manual will include the PM tasks and the recommended frequency for the new units.

4.10 Typical Warranty
Chiller manufacturer’s warranty on material is typically five years, with applicable terms and conditions. The labor or workmanship warranty is one year from the start of the beneficial use of the chillers or installation of acceptance, whichever comes first.

<table>
<thead>
<tr>
<th>Description</th>
<th>Warranty Period (a)</th>
<th>Post-Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st Year</td>
<td>Post 1st Year</td>
</tr>
<tr>
<td>Chiller, Material</td>
<td>ESG</td>
<td>OEM(b)</td>
</tr>
<tr>
<td>Chiller, Workmanship (Labor)</td>
<td>ESG</td>
<td>Customer</td>
</tr>
</tbody>
</table>

(a)Typical warranty period is 1 year after the start of beneficial use or substantial completion of the measure, whichever is earlier.
(b)Original Equipment Manufacturer

4.11 Expected Life
Based on ASHRAE, the expected service life of air-cooled chillers is 20 years.

4.12 Occupant Comfort
The new chillers are expected to have improved reliability and efficient part-load operations which should lead to improved occupant comfort.
5 ECM: Controls Upgrades / Recommission (ECM 5 & 6)

5.1 Description

The measure proposes to upgrade existing HVAC system and temperature controls to make the system more efficient. This includes upgrades and in some cases new Energy Management Systems (EMS).

Applicable Sites:
- Ardmore Community Center
- Ardmore Library
- Bala Cynwyd Library
- Belmont Community Center
- Bryn Mawr Community Center
- County Line Complex
- Domestic Animal Detention Center (Koegel Complex)
- Ludington Library
- PALM Building
- Public Safety Building
- Township Administration Building

5.2 Existing Conditions

Table 5.2-1. Existing HVAC System Controls.

<table>
<thead>
<tr>
<th>Facility</th>
<th>System</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Community Center</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
<tr>
<td>Ardmore Library</td>
<td>Local Control</td>
<td>No existing controls</td>
</tr>
<tr>
<td>Bala Cynwyd Library</td>
<td>Local Control</td>
<td>Honeywell system</td>
</tr>
<tr>
<td>Belmont Community Center</td>
<td>Local Control</td>
<td>No existing controls</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>Local Control</td>
<td>No existing controls</td>
</tr>
<tr>
<td>County Line Complex</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
<tr>
<td>Domestic Animal Detention Center (Koegel Complex)</td>
<td>Local Control</td>
<td>No existing controls</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
<tr>
<td>PALM Building</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
<tr>
<td>Public Safety Building</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
<tr>
<td>Township Administration Building</td>
<td>Temperature controls</td>
<td>Carrier Comfort System</td>
</tr>
</tbody>
</table>
### 5.3 Proposed Scope

Table 5.3-1. Proposed HVAC System Controls.

<table>
<thead>
<tr>
<th>Facility</th>
<th>System</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Ardmore Community Center        | Temperature controls        | Add Controls to existing Boiler  
• New ATC enclosure, controller, router, 120VAC power  
• Boiler enable relay & alarm status relay (3)  
• HW supply temp sensor in common header  
• Pump S/S relay & Status CT (qty 3)  
Install (1) space temperature sensor in gym and (2) relays to control existing ceiling unit heaters. Install BACnet thermostat for (4) split system, use existing wires network to Main panel |
| Ardmore Library                 | Temperature controls        | New boiler  
1. New ATC enclosure, controller, router & 120VAC power  
• Boiler enable relay, status relay & alarm status relay  
• HW supply temp sensor  
• Pump S/S relay & status CT (qty 2)  
• Ethernet drop will be by Township IT Department  
Install communication bus, mount communications card & integrate to BAS  
Replace existing stand-alone thermostat with BACnet thermostats to control (1) split system in attic & integrate to BAS  
Furnish and install BACnet controllers for vertical fan coils (3) basement  
1st floor & integrate to BAS, including:  
• RA temperature sensor  
• Fan S/S relay and status CT  
• Wiring existing CHW & HW valves  
• Install 24VAC transformer to power controller |
| Bala Cynwyd Library             | Temperature controls        | Add Controls to existing Boiler  
• New ATC enclosure, controller, router, 120VAC power  
• Boiler enable relay & alarm status relay  
• HW supply temp sensor in common header  
• Pump S/S relay & Status CT (qty 2) |
| Belmont Community Center       | Temperature controls        | Add Controls to Boiler  
• New ATC enclosure, controller, router & 120VAC power  
• Boiler enable relay & alarm status relay  
• HW supply temp sensor  
• Pump S/S relay & Status CT (qty 2)  
• Ethernet drop will be by Township IT Department  
• S/S relay and status CT for ceiling mounted FCU adjacent to boiler room  
Install BACnet thermostat in 2nd floor billiards room for cooling only FCU, use existing wires  
• Install temperature sensor on 3rd floor wire to BACnet stat |
## Lower Merion Township / PA Guaranteed Energy Savings Act

### Response to Request for Proposals for an Energy/Operating Cost Reduction Program

<table>
<thead>
<tr>
<th>Facility</th>
<th>System</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryn Mawr Community Center</td>
<td>Temperature controls</td>
<td><strong>Add Controls to existing Boiler</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New ATC enclosure, controller, router &amp; 120VAC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Boiler enable relay &amp; alarm status relay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HW supply temp sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pump S/S relay &amp; Status CT (qty 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ethernet drop will be by Township IT Department</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Install communication bus, mount communications card &amp; integrate to BAS</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Furnish and install BACnet ACS control for vertical fan coils (15), including:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RA temperature sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fan S/S relay and status CT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wiring existing CHW &amp; HW valves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Install 24VAC transformer to power controller</td>
</tr>
<tr>
<td>County Line Complex</td>
<td>Temperature controls</td>
<td><strong>Add Controls to existing Boiler</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New ATC enclosure, controller, router, 120VAC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Boiler enable relay &amp; alarm status relay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HW supply temp sensor in common header</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pump S/S relay &amp; Status CT (qty 2)</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>Temperature controls</td>
<td><strong>One New boiler</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Install new BACnet controller in existing ATC enclosure in boiler room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing changeover valve output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing boiler enable, status &amp; alarm relay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing HW circ pump relay &amp; status CT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing Emergency shutdown relay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New supply &amp; return HW temp sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing 2A, 2B &amp; 2C valves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing ORH and new OA temp sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Network to BAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Replace chiller with air cooled chiller</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Network to new chiller on grade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Install new BACnet controller in existing ATC enclosure in boiler room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pump 3 &amp; 4 VFD existing enable relay &amp; status CT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• BACnet network to VFD's (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing EF-7 relay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Existing Changeover valves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Network to BAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Scope does NOT include replacement of existing Bradley Controls system. This item is budgeted at $110,000 and will be further evaluated if Township decides to include in final project scope.</td>
</tr>
<tr>
<td>PALM Building</td>
<td>Temperature controls</td>
<td><strong>Add Controls to existing Boilers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New ATC enclosure, controller, router, 120VAC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Boiler enable relay &amp; alarm status relay (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HW supply temp sensor in common header</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pump S/S relay &amp; Status CT (qty 2)</td>
</tr>
<tr>
<td>Facility</td>
<td>System</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
|                       | Install (2) BACnet controllers in new boiler panel, including:       | • Control existing OA damper actuator  
• Control existing HW valve  
• Control existing DX (2 stages)  
• New SAT sensor  
• New space temperature sensor  
• Power from panel transformer |
|                       | Replace Smith Boiler with new boiler. (1) boiler will remain         | • Disconnect and reconnect existing control wiring S/S relay, alarm and status relay  
• Reprogram controls  
• Verify operation |
|                       | Boiler option 2, add controls for second boiler at tie to BAS       | • Add controller  
• install S/S relay, alarm and status relays  
• Add to BAS |
|                       | BACnet LINK panel for integration to new BACnet equipment in building | Required for either of the new RTU’s that communicate BACnet |
|                       | Integrate new RTU via BACnet for jail, including:                   | • Interlock smoke detector  
• New space temperature sensor  
• Network to BAS |
|                       | Integrate new ERV-2 via BACnet. Including:                          | • Interlock spoke detector  
• Control separate gas heater  
• Network to BAS |
| Public Safety Building | Temperature controls     | Replace Smith Boiler with new boiler. (1) boiler will remain  
• Disconnect and reconnect existing control wiring S/S relay, alarm and status relay  
• Reprogram controls  
• Verify operation |
|                       | BACnet LINK panel for integration to new BACnet equipment in building | Required for either of the new RTU’s that communicate BACnet |
|                       | Replace RTU serving main space                                     | • Disconnect & reconnect smoke detectors, duct static pressure tubing, bldg. static pressure tubing  
Add new network. Verify operations at BAS |
|                       | Replace RTU serving boardroom                                       | • Disconnect & reconnect smoke detectors add new space temperature sensor, add new network. Verify operations at BAS |
| Township Administration Building | Temperature controls     | Replace Smith Boiler with new boiler. (1) boiler will remain  
• Disconnect and reconnect existing control wiring S/S relay, alarm and status relay  
• Reprogram controls  
• Verify operation |
|                       | BACnet LINK panel for integration to new BACnet equipment in building | Required for either of the new RTU’s that communicate BACnet |
|                       | Replace RTU serving main space                                     | • Disconnect & reconnect smoke detectors, duct static pressure tubing, bldg. static pressure tubing  
Add new network. Verify operations at BAS |
|                       | Replace RTU serving boardroom                                       | • Disconnect & reconnect smoke detectors add new space temperature sensor, add new network. Verify operations at BAS |
5.3.1 Recommission Scope:

1. Review and copy building plans
2. Review Operation and Maintenance manuals
3. Perform functional testing of all applicable equipment using the Building Automation System or Direct Digital Control System
   - Verify equipment controller is communicating
   - Verify setpoints set per customer criteria
   - Verify equipment is scheduled per customer criteria
   - Verify economizer is operational if installed
   - Exercise control of output devices with software commands to verify proper response
   - Verify reset schedules if available are enabled and functioning
   - Verify day / night schedule are enabled for all equipment tied to system
4. Verify sequences of operations and points list for all systems
5. Implement new set points as needed (following guidelines provided in the RFP):
   - temperature set point, equipment schedules, and OA set points
6. Provide a report of changes and Document any deficiencies, defective controllers, sensors, valves, damper actuators and relays

5.4 Savings Impact

The improved controls will provide better temperature control, scheduling and other control sequences, which further optimizes the operation of the HVAC system.

5.5 Savings Methodology

The following methodology, equations and assumptions apply to the utility savings from the measure.
(For governing equations, assumptions and methodology.)
5.6 Rebates & Incentives

None.

5.7 Physical Changes

None expected.

5.8 Utility Interruptions

No significant utility interruption is anticipated. The work will be scheduled so that service to the spaces are minimally impacted.

5.9 Expected Maintenance Requirements

Preventive Maintenance (PM) for the controls will be similar to that for the existing units. The Operation and Maintenance (O&M) manual will include the PM tasks and the recommended frequency for the rebuilt units.
5.10 Typical Warranty

The manufacturer’s warranty on the material used for the controls upgrades is typically 5 years, with applicable terms and conditions. The labor or workmanship warranty is one year from the start of the beneficial use of the rebuilt UVs or installation of acceptance, whichever comes first.

<table>
<thead>
<tr>
<th>Description</th>
<th>Warranty Period&lt;sup&gt;(a)&lt;/sup&gt;</th>
<th>Post-Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Year</td>
<td>Post 1&lt;sup&gt;st&lt;/sup&gt; Year</td>
</tr>
<tr>
<td>Controls, Material</td>
<td>ESG</td>
<td>OEM&lt;sup&gt;(b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Controls, Workmanship (Labor)</td>
<td>ESG</td>
<td>Customer</td>
</tr>
</tbody>
</table>

<sup>(a)</sup> Typical warranty period is 1 year after the start of beneficial use or substantial completion of the measure, whichever is earlier.

<sup>(b)</sup> Original Equipment Manufacturer.

5.11 Expected Life

Based on ASHRAE, the expected service life of electronic controls is 15 years.

5.12 Occupant Comfort

The upgrades controls are expected to provide improved operations and efficient part-load operations which should lead to improved occupant comfort.
7 ECM: Replace RTUs/SPLIT (ECM 7)

7.1 Description

The measure proposes to replace existing Rooftop Units (RTU) and/or Air-Handling Units (AHU) with new, more efficient units.

Applicable Sites:
- PALM Building
- Township Administration Building
- Public Safety Building

7.2 Existing Conditions

Table 7.2-1. Existing RTUs/AHUs.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Unit</th>
<th>Qty</th>
<th>Area Served</th>
<th>Cooling</th>
<th>Heating</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALM Building</td>
<td>DX</td>
<td>1</td>
<td>Cafeteria</td>
<td>DX</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Township Building</td>
<td>RTU</td>
<td>2</td>
<td>Gym</td>
<td>N/A</td>
<td>HW</td>
<td></td>
</tr>
<tr>
<td>Public Safety</td>
<td>RTU</td>
<td>1</td>
<td>Library</td>
<td>DX</td>
<td>HW</td>
<td></td>
</tr>
</tbody>
</table>

7.3 Proposed Scope

The existing Rooftop Units/Air Handling Units (RTUs/AHUs), as shown in Table 7.2-1, are near or past their expected service life. The scope of work addressed here covers the unit replacement.

We propose new RTUs/AHUs listed in Table 7.3-1 as these units are more efficient. The controls on the new units will enable seamless interfacing with existing Building Management System (BMS), and afford remote monitoring and controllability.

The RTU/AHU scope includes the following:

1. As specified in Table 7.3-1.
2. Perform testing of supply, return, and outside air to establish baseline airflows at unit. Note that Testing and Balancing (TAB) of entire air distribution systems not included unless specified.
3. Removal and disposal of the existing unit(s).
4. Provide refrigerant access ports as required and recover existing refrigerant with EPA-certified existing recovery equipment prior to the demolition of existing rooftop units. The refrigerant recovery process will be performed under supervision of master licensed technician. The recovered refrigerant and rooftop unit will be disposed in accordance with the regulation of EPA section 608. Contractor involved in the disposal of rooftop equipment will certify to the EPA regional office.
5. Remove existing condensate drain piping and provide SCH 40 PVC pipe with solvent fitting for new condensate drain piping. Run condensate drain pipe to the nearest roof drain with adjustable pipe supports, MIRO model 2.5-CS-5 or equal.
6. Install new RTUs/AHUs (Table 7.3-1).
7. Reuse existing curb and provide adapter roof curb as necessary. Remove existing curb seal and provide new rubber gasket to the top of existing roof curb to seal new rooftop unit to curb.
8. Reuse existing control wiring as much as possible, otherwise replace existing control wiring with new as required.
9. Remove existing power conductors and conduit up to below roof deck, provide new junction boxes, and extend new electrical conductors and conduits in accordance with NEC to new rooftop units. Use existing roof penetrations as possible. Provide waterproof seal around roof penetration as required.
10. Insulate refrigerant and/or HW piping, as needed and place appropriate labels.
11. Change out obsolete DDC to SE I/A series.
12. Reuse as many existing sensors as possible.
13. Wire unit’s comm. and SE I/A interface to existing BMS.
14. Connect controls to BMS (as applicable).
15. Perform startup, testing, and complete associated documentation.
16. Perform testing to verify airflows are the same (within an agreed-upon percentage) as baseline tests.

Table 7.3-1. Proposed RTUs/AHUs.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Unit</th>
<th>Qty</th>
<th>Cooling</th>
<th>Heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALM Building</td>
<td>DX Unit</td>
<td>1</td>
<td>DX</td>
<td>N/A</td>
</tr>
<tr>
<td>Township Building</td>
<td>RTU</td>
<td>2</td>
<td>N/A</td>
<td>Nat Gas</td>
</tr>
<tr>
<td>Public Safety</td>
<td>RTU</td>
<td>1</td>
<td>DX</td>
<td>HW</td>
</tr>
</tbody>
</table>

New RTU/AHU sized to match existing.

7.3.1 Assumptions & Exclusions

1. The existing control valves, electrical, controls wiring, and other reused infrastructure were visually examined at the time of the field audit, and were found to be in adequate working condition, and assessed to be suitable for reuse.
2. Excludes hazmat abatement.
3. Scope includes turnkey installation and incorporates permitting and applicable prevailing wages.
4. The existing structural support is assessed to be adequate for the new RTUs for the preliminary evaluation.
5. The existing air-distribution system was visually evaluated, found to be in adequate working condition, and hence excluded from the scope of work.
6. AHU / RTU sizing is based on the existing installed capacity for the purpose of this RFP response, once the projects are selected ESG will complete a detailed load analysis and the final AHU / RTU selections will be based on a load analysis and customer preferred manufacturer.

7.3.2 Expected Code Impact

The following are the normally expected code impacts:

1. Hurricane and/or seismic requirements.
2. Minimum Seasonal Energy Efficiency Ratio (SEER) based on applicable energy code.
3. Minimum SEER rating for applicable incentives (not a code).
4. Existing code violations.
5. Noise criteria, especially in zones where maximum noise level at the property boundary.
6. Vibration criteria.
7. Architectural requirements (e.g., units on roof/ground may require screening).

7.4 Savings Impact

The increase in SEER of the proposed RTUs/AHUs means the units use less electrical energy to produce the same cooling effect compared to the existing RTUs. The replacement of the RTUs/AHUs that are well past their expected service life also greatly improves the reliability of the systems. The new control affords better temperature control and scheduling, which further optimizes the operation of the RTUs.

7.5 Savings Methodology

The following methodology, equations, and assumptions apply to the utility savings from the measure. (For governing equations, assumptions, and methodology.)
HVAC Equipment (AHU/RTU) Replacement

\[
E_E = \sum_{i=1}^{8760} [Q_{i,h} + \eta_E + Q_{i,c} + COP_E]
\]

\[
E_P = \sum_{i=1}^{8760} [Q_{i,h}' + \eta_P + Q_{i,c}' + COP_P]
\]

\[
E_S = E_E - E_P
\]

\[
C_S = E_S \times FUR
\]

Where,

- \(E_E\) = Annual energy use of existing system
- \(E_P\) = Annual energy use of proposed system
- \(E_S\) = Annual energy savings
- \(C_S\) = Annual cost savings
- \(Q_{i,h}\) = Hourly heating demand, modeled as a linear fit of OA DBT, with a cut-off temperature above which there is no heating
- \(Q_{i,c}\) = Hourly cooling demand, modeled as a linear fit of OA DBT, with a cut-off temperature below which there is no cooling
- \(\eta\) = Combustion efficiency of heating system based on field data/manufacturer's rating or snap-shot measurements
- COP = Coefficient of performance of the cooling system based on manufacturer's rating
- FUR = Fuel unit utility rate, determined from baseline utility rate analysis

Subscript "i" denotes the number of hours in a year. Subscripts “E” and “P” stand for Existing and Proposed system, respectively.

Assumptions:

1. The heating and cooling efficiency values are relatively constant for the typical loading of associated equipment.
2. The hourly heating/cooling demand of the building is a linear function of the OA DBT.
3. The TMY-3 weather data from the nearest weather station accurately represents the site conditions.
4. The hourly heating/cooling load coefficient is determined by the site-specific TMY values.

7.6 Rebates & Incentives

Act 129 Electric Company Energy Efficiency Programs and Rebates.

7.7 Physical Changes

The following are the key physical changes:

1. The new RTUs/AHUs will replace the existing units.
2. New curbs and structural supports (as applicable).
7.8 Utility Interruptions
No significant utility interruption is anticipated. The RTU changeout will be scheduled so that service to the spaces are minimally impacted.

7.9 Expected Maintenance Requirements
Preventive Maintenance (PM) for the RTUs will be similar to that for the existing units. The Operation and Maintenance (O&M) manual will include the PM tasks and the recommended frequency for the new units.

7.10 Typical Warranty
RTU/AHU manufacturer’s warranty on material is typically 5 years, with applicable terms and conditions. The labor or workmanship warranty is one year from the start of the beneficial use of the RTUs or installation of acceptance, whichever comes first.

<table>
<thead>
<tr>
<th>Description</th>
<th>Warranty Period(^{(a)})</th>
<th>Post-Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTU/AHU, Material</td>
<td>ESG</td>
<td>OEM(^{(b)})</td>
</tr>
<tr>
<td>RTU/AHU, Workmanship (Labor)</td>
<td>ESG</td>
<td>Customer</td>
</tr>
</tbody>
</table>

\(^{(a)}\) Typical warranty period is 1 year after the start of beneficial use or substantial completion of the measure, whichever is earlier.
\(^{(b)}\) Original Equipment Manufacturer

7.11 Expected Life
Based on ASHRAE, the expected service life of RTUs/AHUs is 15 years.

7.12 Occupant Comfort
The new RTUs/AHUs are expected to have improved reliability and efficient part-load operations which should lead to improved occupant comfort.
8a ECM: Air Curtains (ECM 8a)

8.1 Description
The measure proposes to add air curtains to entrance ways to reduce infiltration into building to maintain building comfort.

8.2 Existing Conditions
No existing air curtains

8.3 Proposed Scope
Install an air curtain(s) to the main entrance way for the Ludington Library and Public safety building.

The Air curtain scope includes the following:

1. Furnish and install new air curtain(s).
2. Mount air curtain over entry way door(s)
3. Provide electric power to new air curtain.
4. Install switch to interface with door, to power on unit when door is open.
5. Perform startup, testing, and complete associated documentation.

8.3.1 Assumptions & Exclusions
1. Excludes hazmat abatement.
3. Excludes premium time, unless specifically included in the scope of work.

8.3.2 Expected Code Impact
The following are the normally expected code impacts:
1. None

8.4 Savings Impact
The reduction in infiltration reduce the heating requirement in the winter months and air conditioning in the summer months.

8.5 Savings Methodology
The heating and cooling savings follows the methodology presented below.
### Heating Savings

<table>
<thead>
<tr>
<th>Flow Factor</th>
<th>((\Delta P)^n)</th>
<th>Aggregate Air Leakage Pathway Hole</th>
<th>CFM Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Q)</td>
<td>(=)</td>
<td>(=)</td>
<td>(=)</td>
</tr>
<tr>
<td>HDD</td>
<td>Fuel $/MMBTU</td>
<td>Fuel / Mechanical Efficiency Factor</td>
<td></td>
</tr>
</tbody>
</table>

\[
2) \quad \text{Savings} = \frac{\text{CFM}}{\text{HDD for Location} \times \text{Fuel Cost in \$}} = \text{Savings in Dollars}
\]

3) \(\text{Savings from Air Leakage Control} = \text{Savings in Dollars}\)

4) \(\text{Project Investment} = \text{Investment in Dollars}\)

5) \(\text{Simple Payback} = \text{Investment / Savings}\)

#### 8.6 Rebates and Incentives

None

#### 8.7 Physical Changes

The following are the key physical changes:

1. The new units will be mounted above doorway.

#### 8.8 Utility Interruptions

No significant utility interruption is anticipated.
8.9 Expected Maintenance Requirements
None anticipated

8.10 Typical Warranty
Warranty is 1 year from installation

8.11 Expected Life
10 years

8.12 Occupant Comfort
The new air curtains will improved occupant comfort.
8b/c ECM: New Domestic Hot Water (DHW) Heaters (ECM 8b, 8c)

8.1 Description

The measure proposes to replace existing Domestic Hot Water heaters with new high-efficiency, condensing DHW heaters.

8.2 Existing Conditions

Table 8.2-1. Existing DHW Details.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Qty</th>
<th>Input(a) MBH / Kw</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>1</td>
<td>18 kw</td>
<td>(1) 119 Gal insulated</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>1</td>
<td>100</td>
<td>(1) 120 Gal insulated</td>
</tr>
</tbody>
</table>

(a) MBH is 1000 BTUs/hr

8.3 Proposed Scope

The existing DHW heaters have experienced maintenance issues and/or are past their expected service life. In addition, the existing heaters are inefficient. Taking into consideration these factors, ESG proposes the approach detailed in Table 3.3-1.

We propose high efficiency DHW heaters, as these units can operate more efficiently during low-demand period. Furthermore, the burners in the existing heaters have relatively poor turndown, which results in higher standby losses. The proposed heaters, with higher turndown, reduce standby losses, resulting in additional fuel savings.

Table 8.3-1. Proposed DHW details.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Qty</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Input MBH</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>1</td>
<td>AO Smith Cylone</td>
<td>BTH-120A-250</td>
<td>120</td>
<td>119 Gal storage tank</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>1</td>
<td>AO Smith Cylone</td>
<td>BTH-120A-250</td>
<td>120</td>
<td>119 Gal storage tank</td>
</tr>
</tbody>
</table>

The DHW heater scope includes the following:

- Removal and disposal of the existing heater(s).
- Furnish and install new heater(s).
- Install flue stack appropriate for condensing heaters.
- Install an approved method for draining the condensate from the flue gases.
• Connect the new heater(s) to the new stack, supply and return lines, make-up water, drain (blow-down), and fuel lines.
• Complete necessary piping modifications, including appropriate pipe support for the new heater(s).
• Complete electrical connections for the heater(s), pump(s), and controls.
• Upgrade/reuse existing safety shutoff(s).
• New heater pad(s), unless the existing can be reused.
• Insulate piping, place appropriate labels.
• Scope includes turnkey installation and incorporates permitting and applicable prevailing wages.
• Perform boiler startup, testing, and complete associated documentation.

8.3.1 Assumptions & Exclusions

1. The existing piping, valves, expansion tanks, and other appurtenances were visually examined at the time of the field audit, and were found to be in adequate working condition, and assessed to be suitable for reuse.
2. Excludes hazmat abatement.
3. Excludes premium time, unless specifically included in the scope of work.
4. The existing water treatment has been assessed as being adequate and will be retained for serving the new boilers.
5. The existing distribution system outside the mechanical room (was not) evaluated and assumed to be in adequate working condition.

8.3.2 Expected Code Impact

The following are the normally expected code impacts:

• Selected heaters must meet the local air-quality standards and may have to go through appropriate air permitting.
• Minimum efficiency based on applicable energy code.
• Existing code violations.

8.4 Savings Impact

The increase in combustion efficiency of the proposed heater and the reduction in standby losses yield fuel savings. The new heaters reduce the maintenance burden and obviate the need to replace the aging assets (capital avoidance) in the next 15 years.

8.5 Savings Methodology

The following methodology, equations, and assumptions apply to the utility savings from the measure.
8.6  Rebates and Incentives

UGI Utility Rebate Natural Gas Program.

<table>
<thead>
<tr>
<th>DHW Heater Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>$E_E = \sum^{8760}_{i=1} (Q_i ÷ \eta_E)$</td>
</tr>
<tr>
<td>$E_P = \sum^{8760}_{i=1} (Q_i ÷ \eta_P)$</td>
</tr>
<tr>
<td>$E_S = E_E - E_P$</td>
</tr>
<tr>
<td>$C_S = E_S \times FUR$</td>
</tr>
</tbody>
</table>

Where,

- $E_E$ = Annual energy (fuel) use of existing system
- $E_P$ = Annual energy use of proposed system
- $E_S$ = Annual energy savings
- $C_S$ = Annual cost savings
- $Q_i$ = Hourly heating demand
- $\eta$ = Combustion efficiency of heating system based on field data, manufacturer’s rating or snapshot measurements
- $FUR$ = Fuel unit utility rate, determined from baseline utility rate analysis

Subscript “i” denotes the number of hours in a year. Subscripts “E” and “P” stand for Existing and Proposed system, respectively.

Key Assumptions:

1. Combustion efficiency values are relatively constant for the typical loading of heaters.

8.7  Physical Changes

The following are the key physical changes:

- The new units will replace the existing DHW heaters.

8.8  Utility Interruptions

No significant utility interruption is anticipated.

8.9  Expected Maintenance Requirements

Preventive Maintenance (PM) for the new units will be similar to that for the existing. The Operation and Maintenance (O&M) manual will include the PM tasks and the recommended frequency for the new units.
8.10 Typical Warranty

DHW manufacturer’s warranty on material is typically 5 to 10 years, with applicable terms and conditions. The labor or workmanship warranty is one year from the start of the beneficial use of the boilers or installation of acceptance, whichever comes first.

<table>
<thead>
<tr>
<th>Description</th>
<th>Warranty Period&lt;sup&gt;(a)&lt;/sup&gt;</th>
<th>Post-Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Year</td>
<td>Post 1&lt;sup&gt;st&lt;/sup&gt; Year</td>
</tr>
<tr>
<td>DHW System, Material</td>
<td>ESG</td>
<td>OEM&lt;sup&gt;(b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>DHW System, Workmanship (Labor)</td>
<td>ESG</td>
<td>Customer</td>
</tr>
</tbody>
</table>

<sup>(a)</sup>Typical warranty period is 1 year after the start of beneficial use or substantial completion of the measure, whichever is earlier.

<sup>(b)</sup>Original Equipment Manufacturer.

8.11 Expected Life

Based on ASHRAE, the expected service life of condensing DHW heaters is 15 years.

8.12 Occupant Comfort

The new heater(s) are capable of providing enhanced control of hot water temperatures which should result in improved occupant comfort.
8d ECM: New Pool Pump

8.1 Description

The first cost of energy-efficient motors is generally higher than for standard motors, depending on the motor, manufacturer, and market competition. However, their life-cycle costs can make them far more economical because of savings they generate in operating expense.

Often overlooked savings result from the fact that energy-efficient motors run cooler than their standard counterparts, resulting in increased motor, insulation, and bearing life. In general, an efficient motor is also a more reliable motor: fewer winding failures, longer periods between needed maintenance, and fewer forced outages.

This measure proposes to replace existing pool pump with high-efficiency motors.

Applicable Schools:
- Ardmore Pool Complex

8.2 Existing Conditions

The existing motor is older and in only fair condition but looks to have been well maintained. The motor is used to circulate pool water during pool usage.

8.3 Proposed Scope

Replace existing pool pump motor with premium efficiency inverter duty motors.

This efficiency improvement translates into energy and dollar savings.

Basic Scope per pump:

1. Shut off the main electric power to the motor to be replaced.
2. Remove the existing HW pump and associated safety disconnect.
3. Install the new HW pump and the new safety disconnect.
4. As applicable, reuse existing concrete pad and other infrastructure.
5. Turn power back on, inspect unit operation and proper rotation and perform necessary electrical tests.
6. Dispose old motors properly.

8.3.1 Assumptions & Exclusion

1. Scope does not include correction of existing code violations or old wiring issues that are encountered during this retrofit. We will bring code violations and system deficiencies we encounter in the scope of work to your attention. Any work that addresses code deficiency, not expressly included in the scope, is excluded.
2. Scope does not include work to be performed in areas containing asbestos or other hazmat
3. Testing and balancing is excluded from scope as the existing setup is assumed to be in proper balance. This exclusion does not apply if specifically included in scope.
8.4  Savings Impact

Electric demand and energy reduction from the motor upgrade can be expected. If the motor is retrofitted with variable-speed capability, then larger energy savings are realized by operating the motor at reduced speed.

8.5  Savings Methodology

Electric energy savings from motor upgrade follow the methodology presented below.
Motor Replacement

\[
E_E = \sum_{i=1}^{hrs/yr} \left( 0.746 \times \text{HP} \times \text{Load Factor} \div \eta_E \right)
\]

\[
E_P = \sum_{i=1}^{hrs/yr} \left( 0.746 \times \text{HP} \times \text{Load Factor} \div \eta_P \right)
\]

\[
E_S = E_E - E_P
\]

\[
C_S = E_S \times \text{EUR}
\]

VFD Installation

\[
E_E = \sum_{i=1}^{hrs/yr} \left( 0.746 \times \text{HP} \times \text{Load Factor} \div \eta_P \right)
\]

\[
E_P = \sum_{i=1}^{hrs/yr} \left( 0.746 \times \text{HP} \times \text{Load Factor} \div \eta_P \right) \times \left( \frac{\% \text{Power} \times \% \text{Time}}{\eta_{\text{VFD}}} \right)
\]

\[
E_S = E_E - E_P
\]

\[
C_S = E_S \times \text{EUR}
\]

Where,

\(E_E\) = Annual energy (fuel) use of existing system

\(E_P\) = Annual energy use of proposed system

\(E_S\) = Annual energy savings

\(C_S\) = Annual cost savings

\(hrs/yr\) = Operating hours per year

\(\eta\) = Efficiency of motor or VFD based on field data, manufacturer’s rating or snap-shot measurements

\(\text{EUR}\) = Electric utility rate, determined from baseline utility rate analysis

Subscript “i” denotes the number of hours in a year. Subscripts “E” and “P” stand for Existing and Proposed system, respectively.

Key Assumptions:

1. Efficiency values are relatively constant for the typical motor loading as listed in the Tables;
2. A load factor of 70% has been assumed in both existing and proposed conditions;
3. Operating hours assumed 4360 hours per year for existing and proposed.
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

8.6  Rebates & Incentives
Act 129 Electric Company Energy Efficiency Programs and Rebates.

8.7  Physical Changes
1. New HW pumps and associated disconnects.

8.8  Utility Interruptions
None.

8.9  Expected Maintenance Requirements
For a simple motor retrofit, no significant change in motor maintenance as the new motor simply replaces an older unit. When a motor operates at variable speeds, then the associated Variable Speed Drive (VSD)/VFD needs maintenance in line with the manufacturer’s recommendation.

8.10  Typical Warranty
Typical material and labor warranty for a new motor is one year and the warranties begin at the start of beneficial use or at substantial completion, whichever is earlier.

8.11  Expected Life
Based on ASHRAE, the expected service life of electric motors is 18 years.

8.12  Occupant Comfort
Typically no impact.
8e ECM: Attic Insulation ECM(8e)

8.1 Description

Energy loss from a building is inevitable. The forces of equilibrium (the physics of nature) continually strive to balance the heat energy on the inside with that on the outside. Proper insulation helps reduce the rate at which energy is lost through the building, and minimizes the amount of time the heating or cooling system must be on to keep the temperature within a comfortable range.

8.2 Existing Conditions

Attic Insulation (Ardmore Library) - Attic where (2) new air handlers and duct systems are located has only a small area of insulation batts scattered around. With air handler units and air distribution duct systems in attic, they are subject to extreme hot temperature in summer and cold in winter. Plan is to increase the overall R-value of the entire attic, resulting in normalized attic temperatures resulting in energy savings and comfort to occupants.

8.3 Proposed Scope

Install batt insulation in the attic area of the Ardmore Library to increase the overall R-value to 38.

8.3-1 Assumptions & Exclusions

1. Electrical Hazards – Testing and/or repair of hazardous electrical components (knob and tube wiring, open junction boxes, etc.) that are encountered are excluded from the scope of work and pricing. Others are responsible for testing and/or repair of electrical hazards.

2. Hazardous Materials – Testing, remediation, and/or removal of any potentially hazardous material that is encountered is excluded from the scope of work and pricing. Others are responsible for testing, remediation, and/or removal of potentially hazardous material.

8.3-2 Expected Code Impact

None.

8.4 Savings Impact

Reduction in heating and cooling bills.
8.5 Savings Methodology

The heating and cooling savings follows the methodology presented below.

<table>
<thead>
<tr>
<th>INFILTRATION/ EXFILTRATION SAVINGS CALCULATION METHODOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heating Savings</strong></td>
</tr>
<tr>
<td>Flow Factor x ((\Delta P)^2) x A x Aggregate Air Leakage Pathway Hole = Cubic Feet / Minute (CFM)</td>
</tr>
<tr>
<td>Q = Flow Factor x Wind Pressure x Leakage Pathway Hole = Cubic Feet / Minute (CFM)</td>
</tr>
<tr>
<td>Q x HDD x Fuel $/MMBTU = Savings in Dollars</td>
</tr>
<tr>
<td>2) Savings = (\frac{CFM \times HDD \times Fuel \ Cost \ in $}{Efficiency \ Factor}) = Savings in Dollars</td>
</tr>
<tr>
<td>3) Savings from Air Leakage Control = Savings in Dollars</td>
</tr>
<tr>
<td>4) Project Investment = Investment in Dollars</td>
</tr>
<tr>
<td>5) Simple Payback = Investment / Savings</td>
</tr>
</tbody>
</table>
### INFRINGEMENT/ EXFILTRATION SAVINGS CALCULATION METHODOLOGY

#### Cooling Savings

<table>
<thead>
<tr>
<th>Flow Factor</th>
<th>$(\Delta P)^n$</th>
<th>A</th>
<th>CFM Reduction</th>
</tr>
</thead>
</table>

1) \( Q = \) Flow Factor \( \times \) Wind Pressure \( \times \) Aggrate Air Leakage Pathway Hole = Cubic Feet / Minute (CFM)

<table>
<thead>
<tr>
<th>Total Heat Constant</th>
<th>CFM Reduction</th>
<th>Enthalpy</th>
<th>Tons</th>
</tr>
</thead>
</table>

2) \( Tons = \) \( \frac{4.5 \times CFM \text{ Reduction} \times \text{Enthalpy Value}}{12,000} \) Tons

<table>
<thead>
<tr>
<th>BTU Hour per Tons</th>
</tr>
</thead>
</table>

3) kWh Savings = \( \frac{Tons \times kW \text{ per Ton} \times \text{Cooling Hours for Location}}{1.2} \) kWh

<table>
<thead>
<tr>
<th>Tons</th>
</tr>
</thead>
</table>

4) Savings = kWh Savings \( \times \) Fuel Cost/kWh = Savings in Dollars
THERMAL INSULATION SAVINGS CALCULATION METHODOLOGY

Heating and Cooling Savings

1) Pre-retrofit Heat Loss

\[
\text{Heat Loss} = \frac{\text{U-Value} \times \Delta T \times \text{A}}{24 \text{ hrs/day} \times 0.75 \times \text{Surface Area} \times 1,000,000}
\]

Convert MMBtu

\[
\text{Heat Loss} = \frac{\text{Pre-retrofit Heat Loss in MMBtu} \times \text{Cost / MMBtu} \times \text{Heating Efficiency Factor}}{\text{Pre-retrofit Heat Loss in $}}
\]

2) Post-retrofit Heat Loss - Same Calculations as Above

#1 Result

#2 Result

3) Savings

\[
\text{Savings} = \text{Pre-retrofit Loss} - \text{Post-retrofit Loss} = \text{Savings in Dollars}
\]
8.6 Rebates & Incentives
None identified.

8.7 Physical Changes
Building envelope will be seal to prevent unwanted air leakage into the building.

8.8 Utility Interruptions
None.

8.9 Expected Maintenance Requirements
No maintenance required. Replacement only for door sweeps when product is worn out.
8f ECM: Attic Insulation ECM(8f)
8.1 Description
Energy loss from a building is inevitable. The forces of equilibrium (the physics of nature) continually strive to balance the heat energy on the inside with that on the outside. Proper insulation helps reduce the rate at which energy is lost through the building, and minimizes the amount of time the heating or cooling system must be on to keep the temperature within a comfortable range.

8.2 Existing Conditions
Window Replacements – replace select windows at Ludington Library and Belmont Community Center that have historically had leaks.

8.3 Proposed Scope
Replace 6 windows at Ludington Library and 16 windows at Belmont Community Center with new Double pane energy efficient windows.

8.3-1 Assumptions & Exclusions
1. Electrical Hazards – Testing and/or repair of hazardous electrical components (knob and tube wiring, open junction boxes, etc.) that are encountered are excluded from the scope of work and pricing. Others are responsible for testing and/or repair of electrical hazards.
2. Hazardous Materials – Testing, remediation, and/or removal of any potentially hazardous material that is encountered is excluded from the scope of work and pricing. Others are responsible for testing, remediation, and/or removal of potentially hazardous material.

8.3-2 Expected Code Impact
None.

8.4 Savings Impact
Reduction in heating and cooling bills.
8.5 Savings Methodology
The heating and cooling savings follows the methodology presented below.

<table>
<thead>
<tr>
<th>Heating Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Factor</td>
</tr>
<tr>
<td>1) Q = Flow Factor x Wind Pressure x Aggregate Air Leakage Pathway Hole = Cubic Feet / Minute (CFM)</td>
</tr>
<tr>
<td>Q</td>
</tr>
<tr>
<td>2) Savings = CFM x HDD for Location x Fuel Cost in $ = Savings in Dollars</td>
</tr>
<tr>
<td>Fuel / Mechanical Efficiency Factor</td>
</tr>
<tr>
<td>Efficiency Factor</td>
</tr>
</tbody>
</table>

3) Savings from Air Leakage Control = Savings in Dollars

4) Project Investment = Investment in Dollars

5) Simple Payback = Investment / Savings
### Infiltration/Exfiltration Savings Calculation Methodology

#### Cooling Savings

<table>
<thead>
<tr>
<th>Formula</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ Q = \text{Flow Factor} \times \text{Wind Pressure} \times \frac{\text{Aggregate Air Leaks}}{\text{Leakage Pathway Hole}} ]</td>
<td>Cubic Feet / Minute (CFM)</td>
</tr>
<tr>
<td>[ \text{Tons} = \frac{4.5 \times \text{CFM Reduction} \times \text{Enthalpy Value}}{12,000} ]</td>
<td>Tons</td>
</tr>
<tr>
<td>[ \text{kWh Savings} = \frac{\text{Tons} \times \text{kW per Ton}}{1.2} \times \text{Cooling Hours for Location} ]</td>
<td>kWh</td>
</tr>
<tr>
<td>[ \text{Savings} = \frac{\text{kWh Savings} \times \text{Fuel Cost/kWh}}{\text{Savings in Dollars}} ]</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- **Flow Factor:** Typically determined through field testing.
- **Wind Pressure:** Measured in inches of water column (WC). For example, 1 inch WC is equivalent to 0.0407 bar or 0.29921 in Hg.
- **Aggregate Air Leaks:** Total number of leaks identified in the building envelope.
- **Leakage Pathway Hole:** The size of the hole in square feet.
- **CFM Reduction:** Represents the reduction in cubic feet per minute flow rate after sealing.
- **Enthalpy Value:** Typically determined from psychrometric charts.
- **BTU Hour per Ton:** A common unit for heat transfer calculations.
- **kWh per Ton:** The amount of energy required to cool one ton of air.
- **Fuel Cost/kWh:** The cost per kWh of electricity or gas, depending on the fuel source.
THERMAL INSULATION SAVINGS CALCULATION METHODOLOGY

**Heating and Cooling Savings**

1) Pre-retrofit Heat Loss

\[
\text{Heat Loss} = \frac{\text{Existing U} \times \Delta T \times \text{Surface Area}}{\text{HDD (or CDD)} \times 24 \text{ hrs/day} \times 0.75} \times 1,000,000
\]

Convert MMBtu

\[
\text{Heat Loss} = \text{Pre-retrofit Heat Loss in MMBtu} \times \text{Efficiency Factor} \times \text{Cost / MMBtu}
\]

2) Post-retrofit Heat Loss - Same Calculations as Above

\[
\text{Savings} = \text{Pre-retrofit Loss} - \text{Post-retrofit Loss} = \text{Savings in Dollars}
\]
8.6  Rebates & Incentives
None identified.

8.7  Physical Changes
Building envelope will be seal to prevent unwanted air leakage into the building.

8.8  Utility Interruptions
None.

8.9  Expected Maintenance Requirements
No maintenance required. Replacement only for door sweeps when product is worn out.
10 ECM: Building Envelope

10.1 Description

Energy loss from a building is inevitable. The forces of equilibrium (the physics of nature) continually strive to balance the heat energy on the inside with that on the outside. Proper insulation helps reduce the rate at which energy is lost through the building, and minimizes the amount of time the heating or cooling system must be on to keep the temperature within a comfortable range.

10.2 Existing Conditions

During our inspection of Lower Merion Township we found areas in the buildings which can be air sealed and insulated to increase the energy efficiency, comfort, and durability of each building inspected.

Deficiencies found are typical of most facilities. Most building envelope solutions revolve around reducing unwanted air exchange. Gaps, cracks, and holes will be sealed to help stop these unwanted leaks.

To make the building tight we seal leakage paths in the building envelope with appropriate materials. The goal is to repair or create a continuous air barrier system. The order of priority to prevent stack effect are to seal 1) the top and bottom of the building; 2) shafts (multi-story); and 3) the exterior walls.

Site Observations:
There are areas where building upgrades will increase the efficiency of the existing equipment, create a more comfortable interior condition and impact on the sizing of any new equipment intended to be installed as part of the new building usage plan. In addition, the retrofits will help reduce and can even eliminate some of the existing deterioration that is presently occurring. Following are the facts, faults and conditions, which were identified to be major contributors.
Worn/missing weather-stripping on doors and Garage doors
Poorly weather-stripped windows and missing seals

Old inefficient windows due for upgrades (at request of the customer)

Gap at the roof wall section needs sealed where the exterior wall meets the corrugated roof
## 10.3 Proposed Scope

<table>
<thead>
<tr>
<th>Existing Condition</th>
<th>QTY</th>
<th>UOM</th>
<th>Proposed Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY DOOR MAINTENANCE NEEDED.</td>
<td>123</td>
<td>EACH</td>
<td>PERFORM ENTRY DOOR MAINTENANCE</td>
</tr>
<tr>
<td>WORN OUT ENTRY DOOR WEATHERSTRIPPING</td>
<td>99</td>
<td>EACH</td>
<td>REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS</td>
</tr>
<tr>
<td>WORN OUT ENTRY DOOR SWEEP</td>
<td>99</td>
<td>EACH</td>
<td>INSTALL SWEEPS ON ENTRY DOORS</td>
</tr>
<tr>
<td>WORN OUT DOUBLE DOOR WEATHERSTRIPPING</td>
<td>18</td>
<td>EACH</td>
<td>REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS</td>
</tr>
<tr>
<td>WORN OUT DOUBLE DOOR SWEEP</td>
<td>18</td>
<td>EACH</td>
<td>INSTALL SWEEPS ON DOUBLE DOORS</td>
</tr>
<tr>
<td>WORN OUT GARAGE DOOR WEATHERSTRIP</td>
<td>57</td>
<td>EACH</td>
<td>REPLACE GARAGE DOOR WEATHERSTRIPPING</td>
</tr>
<tr>
<td>WORN OUT WINDOW WEATHERSTRIPPING</td>
<td>1672</td>
<td>EACH</td>
<td>REPLACE WINDOW WEATHERSTRIPPING</td>
</tr>
<tr>
<td>EXISTING ROOF WALL GAPS - INTERIOR</td>
<td>1875</td>
<td>LN. FT.</td>
<td>SEAL INTERIOR ROOF/WALL INTERSECTION</td>
</tr>
<tr>
<td>MISSING OR AGED BATT INSULATION</td>
<td>750</td>
<td>SQ FT.</td>
<td>RAISE R-VALUES USING BATT INSULATION</td>
</tr>
<tr>
<td>EXTERIOR ENTRY DOOR REPLACEMENT NEEDED</td>
<td>1</td>
<td>EACH</td>
<td>INSTALL NEW EXTERIOR ENTRY DOOR</td>
</tr>
<tr>
<td>NO EXISTING MEASURES-45</td>
<td>0</td>
<td>EACH</td>
<td>INSTALL DESTRATIFICATION FAN IN HIGH CEILING AREA</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 30’ x 8’</td>
<td>1</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 3’x7’</td>
<td>4</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 6’x4’</td>
<td>1</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 5’x18’</td>
<td>1</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 2’x7’</td>
<td>4</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 1’x7’</td>
<td>4</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 2.5’ x 4’</td>
<td>2</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 2.5’x4.5’</td>
<td>56</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
<tr>
<td>EXISTING SINGLE PANE WINDOW 2.5x2.5’</td>
<td>4</td>
<td>EACH</td>
<td>INSTALL NEW DOUBLE PANE ENERGY EFFICIENCY WINDOWS</td>
</tr>
</tbody>
</table>
10.3-1 Assumptions & Exclusions

1. Electrical Hazards – Testing and/or repair of hazardous electrical components (knob and tube wiring, open junction boxes, etc.) that are encountered are excluded from the scope of work and pricing. Others are responsible for testing and/or repair of electrical hazards.

2. Hazardous Materials – Testing, remediation, and/or removal of any potentially hazardous material that is encountered is excluded from the scope of work and pricing. Others are responsible for testing, remediation, and/or removal of potentially hazardous material.

10.3-2 Expected Code Impact

None.

10.4 Savings Impact

Reduction in heating and cooling bills.
10.5 Savings Methodology

The heating and cooling savings follows the methodology presented below.

IN INFILTRATION/ EXFILTRATION SAVINGS CALCULATION METHODOLOGY

Heating Savings

Flow Factor \( (\Delta P)^{1/2} \) A \( \text{CFM Reduction} \)

1) \( Q \) = Flow Factor \( \times \) Wind Pressure \( \times \) Aggregate Air Leakage Pathway Hole = Cubic Feet / Minute (CFM)

\[ Q \] HDD \[ \text{Fuel \$/MMBtu} \]

2) Savings = \( \frac{CFM \times HDD \text{ for Location} \times \text{Fuel Cost in \$}}{\text{Efficiency Factor}} \) = Savings in Dollars

Fuel / Mechanical Efficiency Factor

3) Savings from Air Leakage Control = Savings in Dollars

4) Project Investment = Investment in Dollars

5) Simple Payback = Investment / Savings
## INfiltration/ Exfiltration Savings Calculation Methodology

### Cooling Savings

<table>
<thead>
<tr>
<th>Flow Factor</th>
<th>$(\Delta P)^n$</th>
<th>A</th>
<th>CFM Reduction</th>
</tr>
</thead>
</table>

1) \( Q = \text{Flow Factor} \times \text{Wind Pressure} \times \frac{\text{Aggregate Air Leakage Pathway Hole}}{\text{Cubic Feet / Minute (CFM)}} \)

<table>
<thead>
<tr>
<th>Total Heat Constant</th>
<th>CFM Reduction</th>
<th>Enthalpy</th>
<th>Tons</th>
</tr>
</thead>
</table>

2) \( \text{Tons} = 4.5 \times \frac{\text{CFM Reduction}}{12,000} \times \frac{\text{Enthalpy Value}}{\text{BTU Hour per Ton}} \)

<table>
<thead>
<tr>
<th>Tons</th>
<th>kW per Ton</th>
<th>Cooling Hours</th>
<th>kWh</th>
</tr>
</thead>
</table>

3) \( \text{kWh Savings} = \text{Tons} \times 1.2 \times \text{Cooling Hours for Location} \)

<table>
<thead>
<tr>
<th>kWh</th>
<th>Fuel Cost/kWh</th>
<th>Savings in Dollars</th>
</tr>
</thead>
</table>

4) \( \text{Savings} = \text{kWh Savings} \times \text{Fuel Cost in $} \)
### THERMAL INSULATION SAVINGS CALCULATION METHODOLOGY

**Heating and Cooling Savings**

1) Pre-retrofit Heat Loss

\[
\text{Heat Loss} = \frac{\text{U-Value} \times \Delta T \times \text{A}}{\text{HDD (or CDD)} \times 24 \text{ hrs/day} \times 0.75 \times \text{Surface Area}} = \frac{\text{Pre-retrofit Heat Loss in MMBtu}}{1,000,000} \text{ Convert MMBtu}
\]

2) Post-retrofit Heat Loss - Same Calculations as Above

\[
\text{Pre-Retrofit Heat Loss in MMBtu} \times \frac{\text{Cost / MMBtu}}{\text{Heating Efficiency Factor}} = \frac{\text{Post-retrofit Heat Loss in$}}{}
\]

3) Savings = Pre-retrofit Loss - Post-retrofit Loss = Savings in Dollars
10.6 Rebates & Incentives
None identified.

10.7 Physical Changes
Building envelope will be sealed to prevent unwanted air leakage into the building.

10.8 Utility Interruptions
None.

10.9 Expected Maintenance Requirements
No maintenance required. Replacement only for door sweeps when product is worn out.
11 HVAC Training

11.1 Description

Training on installed systems is a critical component to continued realization of energy savings. Customized training programs are the key to extending the life of the equipment, as well as ensuring that energy savings are realized. ESG offers every client a customized approach to training that is focused on staff needs as well as existing and newly installed equipment. ESG believes that when working in an educational building setting there are multiple opportunities to involve staff and students in an ongoing education program regarding energy use and practical ways to conserve it. In this way, ESG, together with Lower Merion Township, can reach the larger community about energy efficiency and reducing the carbon footprint. ESG offers customized public relations and communications programs in order to share the successes with the community. This allows Lower Merion Township to lead by example on how to become green while improving facilities in a fiscally responsible manner.

ESG has a successful track record of providing valuable technical training and supplements its highly skilled training staff with experienced engineers and project personnel. While some areas of the training are standardized, most of the supplied instruction is customized and can be tailored to be directly associated to the Energy Conservation Measures (ECMs) implemented during construction. ESG works closely with all key Lower Merion Township operations personnel to deliver educational training and seminars on the operation of their specific ECMs as new assets are being brought online, and will continue this training during the guarantee and maintenance services phase. ESG encourages facilities staff to be present when possible during the installation of equipment to further enhance their personal working knowledge. Equally as important, ESG offers programs to educational clients that are designed to educate staff and community members alike. For example, ESG became an integral part of the Baltimore City Public School System (BCPSS) by hosting staff barbecues and providing holiday entertainment to the elementary school children. Additionally, individual ESG staff members became mentors to students of the schools in the ESG scope of work. This is one of the primary reasons that Keith Scroggins, COO of BCPSS, named ESG as the top Energy Services Company among the four he worked with regularly.

This customized and continual training program ensures correct operation of equipment, optimal efficiency and maximum extension of equipment life throughout the term of the agreement. What has worked well for ESG with previous clients is to combine onsite system specific training with equipment (manufacturer)-sponsored classroom training. We have always found the training that occurs onsite and is performed using the specific equipment installed there is always more impactful than classroom work or other off-site training. The result of this training will be a staff member that continually improves and sustains operating efficiency.
11.2 Scope of Work

ESG’s comprehensive training program includes 6 major components:

1. Customized Maintenance Staff Training and Cross-Training
2. Energy Cost-Reduction Training
3. Manufacturer Training
4. Onsite Training
5. Association of Energy Engineering (AEE) Training Center Classes
6. Monitoring of Energy Usage

11.2.1 Customized Maintenance Staff Training and Cross-Training

Personal interviews of maintenance staff are conducted by an ESG Training Specialist as an integral part of the maintenance staff training program to determine skill levels based on professional experience, education, and prior training. Utilizing the information gathered in these interviews, and with input provided from LMT, the ESG Training Specialist selects appropriate classroom educational modules and develops custom training tailored to the needs and skill levels of the staff to be trained. A typical program could contain three classroom days of instruction and two days of hands-on training on actual ECM equipment and/or systems for each staff member. The interviews are conducted before the project installation begins and provides an opportunity to educate the maintenance staff about the project, as well as obtain their support and assistance from the beginning of the project. ESG will work with Lower Merion Township’s personnel to evaluate individual capabilities and propose tailored training programs that meet the needs of the District.

11.2.2 Energy Cost-Reduction Training

ESG has significant in-house resources and advanced technical capabilities to provide the Lower Merion Township with a better understanding of energy conservation technologies and their usage. The complete understanding of overall facility operations and energy consumption that ESG incorporates into its energy cost-reduction training will be of great benefit to your District. The use of in-house ESG personnel for this component of the training, and their extensive experience in identifying and implementing energy conservation methods, will ensure the District realizes all available energy and operational savings.

ESG regularly conducts a wide range of seminars to assist customers in effectively reducing energy costs. These seminars are adapted to each project and include training manuals, educational CDs and instructional videotapes that reinforce the training. Energy Cost Reduction Training will be performed onsite to eliminate staff downtime and will include the information itemized above, as well as information and instruction covering system architecture, operational requirements, and control strategies that can be employed to ensure energy savings.
11.2.3 Manufacturer Training

ESG is vendor and product neutral, with no vested interest in any particular vendor or manufacturer. This impartiality allows us to incorporate the training from the appropriate manufacturer or service provider as the situation warrants. Most manufacturing companies offer excellent training programs, but the training is often focused solely on their product lines. ESG incorporates an annual training allowance, paid for from guaranteed savings, which allows the District to take advantage of the expertise of multiple manufacturers that can provide both an application and theory overview for personnel. ESG will coordinate and organize vendor training on proper equipment operation for personnel and will work with the manufacturer of each major piece of equipment to develop training manuals and a core curriculum that includes assembly/reassembly instructions, troubleshooting tips, and parts lists. This training includes operation, maintenance, and troubleshooting for all major equipment items.

11.2.4 Onsite Training

ESG provides onsite training for all equipment installed under the performance contracting program. Our research indicates that the most effective training takes place when performed on the actual equipment. Additionally, onsite training allows for smaller class size, customized curriculum, and less downtime.

Training is performed throughout the term of the contract in order to update skills, provide the latest information and train new personnel. Training programs are taped as a reference tool for personnel and new staff. ESG will prepare tutorials and other training materials (including videos, CDs, and text) that will assist the LMT in training new staff, as well as providing a library of training materials for existing personnel.

Part of the onsite training involves monitoring strategies to ensure that all personnel are knowledgeable on how to properly monitor the performance of all equipment installed as part of the project, as well as any related systems involved in the savings to be produced.

ESG’s integrated training programs address the purpose and operation of each piece of equipment, how that equipment interacts with other ECMs, and its effects on the performance of other building systems. This training component also provides critical and relevant information on system interactions and integrated performance in an effort to optimize savings. ESG recognizes that proper training of personnel can influence operating and energy savings for Lower Merion Township and has significant resources in place to meet this objective.

11.2.5 Association of Energy Engineers (AEE) Training Center

When applicable, ESG will enroll Lower Merion Township staff in classes offered by the Association of Energy Engineers. Appropriate classes and the staff selected to attend are determined jointly by ESG and the Lower Merion Township.

Table 11-1 is a sample of a training matrix which would be coauthored by ESG and Lower Merion Township. Training is a function of the ECMs installed, the staff responsibilities and the nature of the required maintenance and operation.
ESG will work with the District to determine the most effective means for making the connection between our project and energy initiatives in the community. We can assist in establishing new programs or expand ones that are already active.

11.2.6 Monitoring of Energy Use

After the ECM or system is installed, energy savings are determined at a single occurrence, continuously, or at regular intervals as outlined in the contract. Baseline energy use, post-installation energy use, and energy (and cost) savings can be determined using one or more of the following Measurement and Verification (M&V) techniques:

- Targeted Measurements and Engineering Calculations (Option A)
- Metering and Monitoring (Option B)
- Utility Meter Billing Analysis (e.g., EnergyCap™ energy accounting software, Option C)
- Computer Simulations (e.g., DOE-2 analysis, Option D)

The savings calculation approach is generally dependent on the M&V option and method selected for the measure. In some instances, a combined M&V option approach is best suited for the measure. For example, for a building with multiple measures, a combination of Options A and Option B may be used for different measures.

Numerous factors can affect energy savings during the term of a contract. These factors include weather, occupancy, operating hours, equipment schedules, equipment maintenance, and equipment loads. How adjustments are made to the baseline if post-installation conditions are different than baseline conditions is dependent upon the M&V method option being implemented.

The options differ in their approach to the level and duration of baseline and performance period measurements. M&V evaluations for both options A and B are made at the retrofit or system level. Option C evaluations are made at the whole-building or whole-facility level. Option D evaluations, which involve computer simulation modeling, are made at either the retrofit or the whole-building level (for model calibration purposes). Regardless of which option or combination of options, ESG will provide LMT with annual reports and interim feedback, especially if any issues seem to be apparent.
Table 11-1. Sample Training Matrix.

<table>
<thead>
<tr>
<th>ECM Group</th>
<th>ECM</th>
<th>Proposed Training</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lighting</strong></td>
<td>Upgrade Lighting</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Lighting Controls</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Exterior Lighting Upgrades</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Optimize Vending Machine Operation</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td><strong>Electrical Systems</strong></td>
<td>Transformer Upgrades</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Demand Response with Electrical Submetering</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td><strong>Mechanical Systems</strong></td>
<td>Seal AHU Air Leaks</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Upgrade Kitchen Hood Fan Controls</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Upgrade Electric Motors</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Variable Volume Pumping</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>SCUP#2 Expansion</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Boiler Control Upgrades</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Heat Recovery</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Upgrade Chiller Plant Controls</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Fume Hood Conversion to Flow Safe</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Domestic Water Heater Replacement</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td><strong>HVAC Controls</strong></td>
<td>Retro-Commissioning</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Unoccupied OA Elimination</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Demand Controlled Ventilation</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Equipment Scheduling</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Unoccupied Temperature Setback/Setup</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Optimize VFD Controls</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Fan Coil/Unit Ventilator Controls</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td><strong>Water Upgrades</strong></td>
<td>Water Consenation</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Cooling Tower Sewer Deduct Meter</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td></td>
<td>Water Meter Replacement</td>
<td>O&amp;M Manual</td>
</tr>
<tr>
<td></td>
<td>Solar Thermal</td>
<td>One-time demonstration and O&amp;M manual</td>
</tr>
<tr>
<td><strong>Building Envelope Upgrades</strong></td>
<td>Building Envelope Upgrades</td>
<td>O&amp;M Manual</td>
</tr>
</tbody>
</table>
12 ECM Academy of STEAM/Health Exploration

Energy Systems Group (ESG) will provide a STEAM/Health career exploration and college exposure program for 40 Middle School students during the Summer of 2019 from Lower Merion Township. The STEAM/Health program will also include and not limited to enhancing academic skill building, work readiness, instill the concept of “healthy lifestyles”, curriculum development, administrative and management of program services, program learning plan, coordination of guest presenters including ESG technical personnel and counseling of students.

The STEAM/Health program is for middle school Students of Lower Merion Township who expressed interest in attending college and careers in STEAM/Health fields, including: Mechanical and Electrical Engineering, Biomedical Engineering, Aquaculture, Biology, Chemistry, Forensics, Clinical Trials, Astronomy, Pharmacology, Veterinarian Science, Physics etc.

The program activities will consist of discussions, films, videos, lectures, field trips, and various STEAM/Health group projects. There will be reference material, handouts, hands-on projects and/or brochures distributed each week.

- Curriculum-enhancement program encourages natural resource conservation
- Classroom-ready materials, plans, and activities align with K-12 curriculums
- Dedicated website featuring curriculum, community awareness activities, training resources, blogs, competitions, and educational libraries
- Energy Action Challenge component for personal energy conservation
- Includes “motivational” aspects for instructor and student participation

✓ Agriculture
✓ Aquaculture
✓ Robotics
✓ Drones
✓ Farming
✓ Science Museum
✓ Field Trips
✓ Veterinarian Science

✓ Mechanical Engineering
✓ Electrical Engineering
✓ Civil Engineering
✓ Solar PV
✓ Energy Conservation
✓ Water Conservation

energysystemsgroup.com
13 Maintenance

13.1 Description

ESG will work with the Owners Representative to provide post-construction services including but not limited to service contracts, emergency service, training, warranty work, modifications for improved functionality, and enhanced commissioning.

ESG competitively selects and manages service contracts for existing and newly installed equipment and works with our customers to ensure service providers are prequalified and provide a level of service expected and required. Of course, the quality of maintenance can impact the energy savings, the guarantee, and the useful life of the equipment. We negotiate service contracts before awards are made to subcontractors for installation so that the best pricing possible is realized. This holds especially true with Combined Heat and Power (CHP/CoGen) systems. We also negotiate Long-Term Service Agreements (LTSA) for the duration of time that either the customer requires or that complements the Measurement and Verification (M&V) or guarantee duration.

The maintenance (i.e., preventive maintenance and/or emergency response) service will come under the purview of ESG's Corporate Operations Service group. The Northeast Regional Branch will initially be responsible for coordinating the maintenance work. Upon issuance of the preventive maintenance contract, ESG will provide a schedule to Hazelton Area School District (LMT) for the preventive maintenance portion of service. The schedule will include specific equipment (assets) at various buildings and associated preventive maintenance tasks. The schedule will enable proper planning and coordination between ESG staff and the school operations staff, and will account for seasonal operational factors. Emergency response will be coordinated with the school district staff on a case-by-case basis.

13.2 Scheduled Preventive Maintenance

Preventative and emergency maintenance and servicing of the equipment installed will be provided only through the warranty period with no reductions in staffing as per the RFP requirements unless otherwise agreed upon during the Comprehensive Energy Audit (CEA) period. The maintenance agreements will provide 2-hour response by phone and 4-hour response onsite during critical system failures. If it is agreed upon between LMT and ESG during the initial phone response that corrective action can wait until the following morning, then a service technician or mechanic will arrive by 8:00 am the following day or work day.

ESG considers scheduled preventive maintenance of existing and new equipment to be a critical part of the performance period, On-Going Services. We believe this provides us with a unique advantage in ensuring quality and timeliness of work being performed. Also, LMT can expand the scope of maintenance to include equipment not replaced by ESG. In this arena, ESG can offer competitive pricing for these services as a bundled package to LMT.
If the scope and extent of preventive maintenance service can justify a full-time staff, ESG will propose using an in-house staffer. However, if the preventive maintenance scope requires part-time commitment, ESG will propose subcontracting the service. ESG will work with the school district to select the most economical path for providing the preventive maintenance service and the subcontractor will be chosen in consultation with LMT.

ESG understands that LMT has existing relationships and preventative maintenance agreements with several vendors such as HVAC Inc./CSI Controls and Cardinal Controls. ESG will continue to build those existing relationships. One of the ways ESG can assist LMT is by adding additional hours to the EPC contract to enhance energy savings strategies such as controls strategies to improve energy conservation.

ESG will support LMT to achieve the level of knowledge to best serve the students, teachers, and staff.

13.3 Warranty

The warranty information will be in accordance with the program requirements. For example, the manufacturer warranty (for defective material) is typically 5 years for LED units and 5 years or 50,000 hours for associated drivers. Similar warranties for non-condensing, hot-water boilers vary from 5 to 10 years from various manufacturers. ESG will transfer manufacturers’ warranties to LMT, the details of which will be reflected in Operating & Maintenance Manuals. The warranty period will start when beneficial use begins.

13.4 Emergency Service

ESG’s approach to emergency service would parallel the approach discussed above for Preventive Maintenance Service. The maintenance agreements will provide 2-hour response by phone and 4-hour response onsite during critical system failures. If it is agreed upon between LMT and ESG during the initial phone response that corrective action can wait until the following morning, then a service technician or mechanic will arrive by 8:00 am the following day or work day. However, for emergency service, ESG would propose a subcontractor as backup even if we propose a full-time ESG staff.

ESG’s Emergency Service scope would include the subcontractor’s service to provide backup emergency service, when necessary. Emergency Service is defined as service or maintenance provided during other than regular business hours (TBD) in the event of a critical System failure rendering the system inoperative. Although the typical industry standard for emergency response is two hours by phone and four hours onsite, we employ several different technology strategies that minimize the response time. For example, HVAC Inc. or Cardinal can remotely monitor the controls system and troubleshoot the controls systems via their web services platform.
Section 5: Project Implementation

Section 5A: Implementation Plan – Provide a complete project implementation plan showing the achievement of major project milestones including, but not limited to:

6.5.1.1 Start of implementation.
6.5.1.2 Execution of Energy Performance Contract.
6.5.1.3 Engineering.
6.5.1.4 Obtaining all required permits and government approvals.
6.5.1.5 Procurement of all major equipment.
6.5.1.6 Commencement and completion of construction.
6.5.1.7 Training of Personnel.

Section 5A: Project Implementation Plan

Energy Systems Group (ESG) will be ready to begin implementing a Guaranteed Energy Savings Act project for Lower Merion Township (LMT) upon being selected as their Energy Services Contracting Organization (ESCO). We will schedule meetings between the ESG Project Team, LMT, and Provident Energy Consulting. Together, we will build a more specific schedule tailored to your needs. ESG will take every advantage of opportunities to execute the work sooner rather than later, while not adversely impacting the operations of LMT. Our Project Managers are experienced and knowledgeable in working in educational environments. We have successfully completed over $500 million in Local Government projects, all with a common goal — “Customer Satisfaction.”

This project will require the coordination and management of resources both internal and external to ESG.

A key to consistent delivery of our systems and services is our attention to Project Management. We expect the project for LMT to consist of multiple Energy Conservation Measures (ECMs) throughout the entire breadth of the project. At ESG, a Project Manager is provided as a single focal point for all contracts with responsibility for the implementation phase of the project. The Project Manager(s) will work closely with LMT’s designated representatives. ESG will provide qualified personnel for continuous and effective oversight of the project.

Effective Project Management applies technical expertise, project knowledge, people, and communication skills, as well as management talent, in a proactive manner to ensure that our contract commitments are met on time, within budget, and at the quality levels expected by LMT.

“ESGs project management from the front end of the project through the construction phase was over the top. The thoroughness of their planning and attention to even the minutest details made the project go extremely smooth. They resolved operational and comfort issues with an HVAC system that other companies have been working to mend for over ten years. The construction phase was ‘hands off’ for me and was performed so efficiently most people didn’t even realize that construction was ongoing in their building. For McDowell County Schools there is no other energy management company.”

— Will Chapman – Director of Maintenance and Safety, McDowell County
Project Manager's Principle Responsibilities

- Interface with the Project Development Team to ensure that prompt and accurate estimates and pricing are consistent with the project’s goals
- Monitor labor, material, and project modifications and make changes to ensure achievement of project objectives
- Review the ongoing progress of the project with LMT, Provident Energy Consulting and ESG’s management and key subcontractors
- Ensure project cost objectives are met
- Develop and maintain ongoing contact with LMT and Provident Energy Consulting to ensure clear and consistent communication about the project’s progress, additional work, training, and subcontractor coordination
- Present LMT with necessary documentation
- Interface the Project Team with subcontractors and LMT representatives
- Avoid problems by understanding LMT’s expectations and resolving complaints as they occur
- Manage costs within the estimate by planning, developing, implementing, monitoring, and taking action as needed
- Create and maintain an efficient, effective project workforce by organizing a strong Project Team and by providing project development, training, and supervision for each member assigned to the project
- Plan and schedule project employee activities to ensure that service is performed to meet LMT’s needs and emergencies are handled expeditiously
- Maintain responsibility for ensuring that the subcontractors follow all OSHA, Federal, State, and safety regulations.

Internal Customers

The Project Manager's principal contacts inside ESG are the Delivery Manager and Account Executive. They advise and assist the Project Manager in managing the account. The Project Manager works closely with the Performance/Mechanical Engineer(s) to obtain information and advice; the Project Delivery Manager (PDM) and Regional General Manager (RGM) on resource needs; any involved third-party engineering personnel to confer on technical information; and, ESG’s management, finance, and accounting support groups.
Working closely with the Delivery Manager, using technical personnel and tools, and keeping management informed of staffing requirements are aspects of the Project Manager’s job that ensure that LMT will receive higher than expected quality. ESG’s Project Manager is committed to staff the project as requirements dictate and create a workforce capable of handling the technologies as well as planning for and using these resources to achieve optimum results.

External Customers

The Project Manager’s primary contacts outside the company are with the designated representatives of LMT’s building management. It is imperative that Project Managers develop and maintain effective ongoing communications with LMT and all other project participants to resolve issues as soon as they occur.

The assigned Project Manager will be the primary contact and interface during the project implementation and LMT acceptance phases. He will be responsible for ensuring that the subcontractors follow all OSHA, Federal, State, and safety regulations.

Construction Efficiencies

Energy Systems Group is the primary member of the Design Team on all projects throughout the pre-construction and post-construction phases. We will coordinate construction activities with LMT’s facilities team. We will utilize on-site Project Management to ensure quality workmanship and provisions for services including:

- Establishing and following a comprehensive project plan built with realistic goals and a contingency plan for any deviations.

- Teaming with established, reliable, and proven partners for subcontract services, clearly outlining the roles, and responsibilities of each.

- Mobilizing the Project Team, delivering an engineered submittal package and coordinating subcontractors, installation, testing, and inspection along with operator training. The Project Manager also addresses all Safety, OSHA, and system disruption risks in a proactive manner and establishes contingency plans for all identified risks.

- As part of the ongoing LMT communication plan, the Project Manager provides weekly reports during the installation phase, which will include updated schedules, potential problems, and completed tasks. This is provided in Quality Assurance meetings attended by key personnel and any other team members designated by LMT.
Project Kickoff

Upon selection as the preferred vendor, ESG will schedule a project meeting with the appropriate personnel.

The objective of this meeting will be to accomplish the following tasks:

- Introduce the project team and stakeholders (LMT, Provident Energy Consulting, and ESG)
- Plan communication methods: Procore™ Construction software, e-mail, teleconferencing, fax, etc.
- Discuss roles and responsibilities
- Review and establish project safety parameters and procedures
- Develop an overall project timeline with milestones as a basis for future development of specific and detailed project schedules
- Review and modify project schedule as required
- Schedule weekly project meetings with LMT personnel
- Discuss concerns, challenges, and expectations, including working in occupied areas
- Discuss necessary resources
- Plan next steps.

In attendance at this meeting will be the entire ESG Project Team. This team will work together throughout the contract to ensure that LMT is satisfied that its needs and concerns are being met.

In-House Versus Subcontracted Services

ESG is a full-service Performance Contractor providing the broadest possible range of ECMs. For the most commonly implemented Energy Performance Contract improvement measures (incorporated in the majority of our projects), we utilize a combination of in-house and subcontracted expertise, providing our customers with the most cost-effective solutions, while applying the most capable and experienced talent to each of the tasks and responsibilities, which results in a highly successful ESPC program.

Note: Personal training is detailed in Section 4 of the proposal.

We have included a project schedule on the following pages of this section for your review.
Section 5B: Project Team

The team for Lower Merion Township is assembled according to specific areas of expertise. Each team member is committed to the success of the performance-based project and we view these individuals as valued contributors to the overall success of your project. Resumes are provided for each member of the project team, including all ongoing support personnel (e.g., measurement and verification personnel, account support personnel).

Account Executive — Mike Bayesa: Serves as the lead account contact for the Lower Merion Township project. Mr. Bayesa is responsible for forming and maintaining the partnership between Lower Merion Township and ESG to effectively communicate the Township’s needs to ESG.

In addition, Mr. Bayesa will consult with the Township regarding project development, as well as interface with all proposed team members, consultants, and contractors who will formulate the project solution. He will serve as the main point of contact and will manage all related activities relative to project selection, financing, and contract negotiations. Mike has over 17 years of experience developing and implementing energy-based projects in Pennsylvania. Mike will serve as a primary point of contact throughout the entire EPC process.

Project Design Lead — John Schmid: Responsible for overseeing all utility analysis, engineering, and design work. Mr. Schmid is responsible for leading the team that gathers the field data, site suitability analysis, energy conservation measure design, performing savings calculations, and developing the engineered solutions. He is involved in strategic coordination of all efforts of Engineering and Project Development leads in collaboration with LMT and the Account Executive. The Project Design Lead manages and coordinates the technical solutions and all details related to assumptions, baseline development, calculations, and selecting recommended solutions and specific equipment. He works closely with the engineering teams and the Account Executive to develop a schedule of activities in collaboration with LMT staff.

ESG Corporate Liaison — Ray Johnson: Responsible for sales activity in the Northeast Region of the United States market. His role is to ensure all required resources are deployed to serve LMT and to ensure customer satisfaction is obtained.

Engineering Lead — Mark Winters: Responsible for overseeing all engineering work. He is responsible for leading the team in the detailed design work for mechanical energy conservation measures, performing savings calculations, and developing the engineered solutions for the Township.
Project Development Lead — Dan Khuu: Responsible for overseeing all utility analysis and project development work. He is responsible for leading the team that gathers the field data, site suitability analysis, energy conservation measure design, performing savings calculations, and developing the engineered solutions for Lower Merion Township.

Construction Manager — Mike Henrich: Accountable for the successful implementation of each phase of the project. He is directly involved in several phases of the performance contract, including development, design, commissioning, construction, measurement and verification, and closeout. For the duration of the project, the Construction Manager provides a single project point of contact for Lower Merion Township management. All construction disciplines will report to Mr. Henrich.

Site Supervisor — Jim Anderson: Accountable for the successful implementation of each phase of the project. He is directly involved in several phases of the performance contract, including development, design, commissioning, construction, measurement and verification, and closeout. For the duration of the project, the Site Supervisor assists the Construction Manager as a single project point of contact for Lower Merion Township management.

Measurement and Verification (M&V) — Donna Wicks, CRM CMVP: Has the responsibility of monitoring the guarantee and presenting results to the Township in a format that is clear and concise. In addition to excellent communication skills, Ms. Wicks has the capability to determine what factors affect energy savings and calculate savings given changing parameters. Some customers may prefer modified baselines showing monthly deviations, while others may prefer to see only savings based on initial verifications and measured equipment operation. Ms. Wicks is adept at meeting these needs. Maintaining and tracking guaranteed energy savings over the length of a program is the final phases of a Performance Contract. The engineering team at ESG also have significant experience in developing detailed M&V plans and work with both LMT and Ms. Wicks to develop the most appropriate M&V plan.

STEM / Educational Programing — Dr. Tahiya Nyahuma: Responsible for developing and coordinating the project-based curriculum that will be implemented as part of the post-project STEM program.

We have included an organizational chart on the following page. Resumes for the core team members listed on the organizational chart have been included on the pages that follow.
Mike Bayesa
Account Executive / Industry Experience: 17 years

Responsibilities

- Engage with customers concerning their facility infrastructure, energy spend, sustainability, energy and capital improvement goals.
- Manage project development including scope of work, project documentation, implementation planning, project financing and M&V setup
- Ensure customer satisfaction from conception to completion
- Develop and implement comprehensive energy efficiency, sustainability, and energy security solutions for mission critical facilities and campuses under energy savings performance contracts, utility energy service contracts, power purchase agreements, public/private partnerships and other performance-based contract mechanisms.

Since 2010 Mike has been helping PA School Districts save utility costs while creating improved learning environments for students and staff.

Education

- Bachelor of Science (B.S.), General Engineering
  - United States Naval Academy, Annapolis, MD

Professional Certifications and Affiliations

- Certified Energy Manager (CEM)
  - Association of Energy Engineers (AEE)
- Certified Sustainable Development Professional (CSDP)
  - Association of Energy Engineers (AEE)
- Leadership in Energy Efficient Design (LEED AP)
  - U.S. Green Building Council

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interboro School District PH4</td>
<td>$7,080,000</td>
</tr>
<tr>
<td>Mountain View School District</td>
<td>$3,400,000</td>
</tr>
</tbody>
</table>

City/State

- City of Wilkes-Barre PH 1 & 2 | $7,640,000
- City of Pittston PH 1 & 2     | $1,640,000
- DE Valley Regional Street Lights | $12,000,000
- Upper Darby Township          | $4,000,000
- Ridley Township                | $1,700,000
- City of Coatesville           | $1,850,000
- Doylestown Borough             | $1,400,000
- City of York PH 1 & 2          | $5,700,000
- West Norton Township           | $1,600,000
- Bradford County                | $3,400,000
- Clinton County                 | $1,700,000

Employment History

- **Energy Systems Group**: Account Executive, Eastern Pennsylvania (2017 – Present)
- **Carrier Corporation**: Market Manager, Eastern PA (2000 – 2010)
Raymond Johnson, PE, CEM, LEED AP
Alternative Energy Manager / Experience: 27 years

Responsibilities

- Develops relationships with third party vendors and coordinate activities from development through delivery.
- Prepares implementation contracts. Completes all schedules and develops specific language as needed for the specific project.
- Attends customer meetings and board presentations to ensure projects are moving forward properly.
- Reviews CEAs prior to formal Risk Review process.
- Ensures all team projects and commitments are internally reviewed.

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Past Projects/Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartford Co. Public Schools, MD</td>
<td>$16,800,000</td>
</tr>
<tr>
<td>Baltimore Co. Public Schools, MD</td>
<td>$27,000,000</td>
</tr>
<tr>
<td>Radnor Middle School, PA</td>
<td>$41,000,000</td>
</tr>
<tr>
<td>Petway Elementary School, NJ</td>
<td>$16,000,000</td>
</tr>
<tr>
<td>Paterson Public Schools, NJ</td>
<td>$23,100,000</td>
</tr>
<tr>
<td>RSU — 57, ME</td>
<td>$13,900,000</td>
</tr>
<tr>
<td>Maywood BOE, NI</td>
<td>$ 2,500,000</td>
</tr>
<tr>
<td>Gradolfield, NI</td>
<td>$ 2,000,000</td>
</tr>
<tr>
<td>Interboro School District, NJ</td>
<td>$ 3,000,000</td>
</tr>
<tr>
<td>Bernville Township SD, PA</td>
<td>$ 6,000,000</td>
</tr>
<tr>
<td>Butler Public Schools, NJ</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Sayville Public Schools, NY</td>
<td>$ 6,200,000</td>
</tr>
<tr>
<td>Gallaudet University, DC</td>
<td>$30,000,000</td>
</tr>
<tr>
<td>Univ. of Medicine &amp; Dentistry, NJ</td>
<td>$25,000,000</td>
</tr>
<tr>
<td>Ocean County College, NJ</td>
<td>$ 3,500,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corrections</th>
<th>Past Projects/Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Virginia DOC, WV</td>
<td>$18,400,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State/Local Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manhasset Township, NJ</td>
</tr>
<tr>
<td>4 Penn Center, PA</td>
</tr>
<tr>
<td>PA State Police, PA</td>
</tr>
<tr>
<td>Susquehanna County</td>
</tr>
<tr>
<td>City of Rome Digester, NY</td>
</tr>
<tr>
<td>City of Cape May, NJ</td>
</tr>
<tr>
<td>NJ State Police, NJ</td>
</tr>
</tbody>
</table>

Copyright © 2018 Energy Systems Group, LLC | Proprietary & Confidential
Section 5 – Project Implementation | 10
John Schmid, CEM, LEED AP
Senior Performance Engineer / Experience: 27 Years

Responsibilities

- Identifies opportunities to improve and optimize facility and infrastructure operations, and designs conceptual solutions based on customer needs. Focuses on renewable opportunities to generate best project benefits for clients.

- Other responsibilities include developing innovative approaches to reduce energy and operational expenditures in facilities, including analysis of energy usage and rates, development of retrofit scope and analysis of long-term financial impact of energy efficient retrofits.

- Survey facilities to determine energy savings potential. Responsible for estimating equipment and installation cost. Daily communication with subcontractors regarding installation.

- Responsible for the overall administrative and technical management of performance-based projects, from preliminary proposal to project completion. Preparation and negotiation of purchase orders; and preparation of initial scope of work, contract, bid documents, and contract letters for prospective clients.

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bensalem SD, PA</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>Interboro, PA</td>
<td>$7,000,000</td>
</tr>
<tr>
<td>Mountain View, PA</td>
<td>$8,500,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City/State</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVRPC, PA</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>PA State Police</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>NJ State Police</td>
<td>$3,500,000</td>
</tr>
<tr>
<td>Wilkes Barre, PA</td>
<td>$7,600,000</td>
</tr>
<tr>
<td>City of Binghamton, NY</td>
<td>$5,500,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Housing</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philadelphia Housing Authority, PA</td>
<td>$75,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Authority</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>JFK Airport, NY</td>
<td>$10,000,000</td>
</tr>
</tbody>
</table>

John recently joined ESG. His representative project (shown) demonstrates a diverse background in developing ESCO projects in the NY, NJ, PA Area.

Education

- B.S. in Electrical Engineering, Rutgers University, New Brunswick, NJ, 1989

Professional Certifications and Affiliations

- Certified Energy Manager (CEM)
- LEED Accredited Professional (LEED)
- Association of Energy Engineers (AEE)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Employment History

Johnson Controls—Twenty Years (20) Years
Johnson Controls, Edison, NJ

Area Sales Manager
March 2012 – May 2016
Managed a team of up to 9 account executives across three states (NJ, PA, NY). Sales team achieved up to $58M in annual sales. Responsibilities: Sales forecasting, Monthly AF coaching, contract negotiations, annual market planning, deal coaching & interface with JCI National Support teams.

Engineering Manager
October 2011 – March 2012
Managed a team of five (5) area engineers supporting projects in all vertical markets across the PA, NJ, WV area.

Solutions Development Leader / Senior Energy Engineer
March 1997 – October 2011
Responsible for all development activities in a geographic area supporting Johnson Controls’ K12 Vertical Market strategy. Managed teams of Engineers in the development of projects and supported account executives with customer presentations, business case development and technical strategies to closing opportunities.
Mark Winters, MBA, P.E., CEM  
Senior Performance Engineer / Experience: 20 years

**Responsibilities**

- Apply creative approach and design to gain maximum energy and operational savings for HVAC systems, electrical systems, pneumatics, and industrial process systems via performance contracting. Knowledgeable about the latest and highest efficiency equipment and control strategies.
- Survey facilities to determine energy savings potential. Responsible for estimating equipment and installation cost. Daily communication with subcontractors regarding installation.
- Responsible for the overall administrative and technical management of performance-based projects, from preliminary proposal to project completion. Preparation and negotiation of purchase orders, and preparation of initial scope of work, contract, bid documents, and contract letters for prospective clients.

**Education**

- MBA, State University of New York at Buffalo
- U.S. Navy Nuclear Power School and Prototype
- BS Mechanical Engineering, Youngstown State University

**Professional Certifications and Affiliations**

- Professional Engineer: CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT & WV
- Certified Energy Manager, Assoc. of Energy Engineers
- Association of Energy Engineers (AEE)
- American Solar Energy Society

**Technical Training**

- University of Wisconsin Energy Auditing Course, Certified Energy Manager Training (AEE), Energy Efficient Chilled Water Systems Seminar, Little Red Schoolhouse (IT Industries), Advance HVAC Control Strategies, AEE New York Department of State Code Division’s Energy

**Past Projects/Markets**

<table>
<thead>
<tr>
<th>City/State</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howard County Government, MD</td>
<td>$5,500,000</td>
</tr>
<tr>
<td>Howard County Govt. — Phase II</td>
<td>$13,600,000</td>
</tr>
<tr>
<td>Maryland Transportation Authority</td>
<td>$9,000,000</td>
</tr>
<tr>
<td>State Highway Administration, MD</td>
<td>$24,300,000</td>
</tr>
<tr>
<td>Wicomico County Government, MD-I</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>Wicomico County Government, MD-II</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Parking Authority of Baltimore (PABC)</td>
<td>$2,700,000</td>
</tr>
<tr>
<td>Montgomery County</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>City of Baltimore Cobra Head Conversion</td>
<td>$19,100,000</td>
</tr>
<tr>
<td>Town of Ocean City, MD</td>
<td>$4,600,000</td>
</tr>
</tbody>
</table>

**Higher Education**

- University of Baltimore, MD                     | $15,400,000          |
- Coppin State University, MD                      | $5,800,000           |

**Water/Wastewater**

- Washington Suburban Sanitary Commission         | $6,500,000           |

**K-12**

- Beecher Road Schools, CT                         | $12,800,000          

Mark has been with ESG for eight years. He has developed over $300 million in energy savings and renewable projects since 2000 for multiple markets including local, state and federal governments, higher education, K-12 schools and water/wastewater.

**Employment History**

- Premier Energy Services, LLC—One and a half (1.5) years
  - Provided energy engineering consulting services that included commissioning and design, evaluation of utility bills, facility and equipment analysis, measurement of equipment performance, client interviews, identification of energy conservation and renewable energy measures, energy saving and energy generation calculations, construction cost estimates
  - Wendel Companies—Three (3) Years
  - Managed and performed energy audits, life cycle analysis, and implementation of energy conservation and facility improvement measures.

*Proprietary & Confidential*
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Dan Khuu, CEM
Senior Performance Engineer / Experience: 24 years

Responsibilities
- Creative approach and design to gain maximum energy and operational savings for HVAC systems, electrical systems, pneumatics, and industrial process systems via performance contracting. Knowledgeable about the latest and highest efficiency equipment and control strategies.

- Survey facilities to determine energy savings potential. Responsible for estimating equipment and installation cost. Daily communication with subcontractors regarding installation.

- Responsible for the overall administrative and technical management of performance-based projects, from preliminary proposal to project completion. Preparation and negotiation of purchase orders, and preparation of initial scope of work, contract, bid documents, and contract letters for prospective clients.

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beecher Road School, CT $13,500,000</td>
<td></td>
</tr>
<tr>
<td>Carmel School District, NY $7,360,000</td>
<td></td>
</tr>
<tr>
<td>South Orange Town School District, NY $4,300,000</td>
<td></td>
</tr>
<tr>
<td>White Plains School District, NY $11,200,000</td>
<td></td>
</tr>
<tr>
<td>Beavercreek School District, OH $1,100,000</td>
<td></td>
</tr>
<tr>
<td>Croton Harmon School District, NY $3,540,000</td>
<td></td>
</tr>
<tr>
<td>Monroe Woodbury, NY $12,000,000</td>
<td></td>
</tr>
<tr>
<td>Beecher Road School, CT $12,800,000</td>
<td></td>
</tr>
</tbody>
</table>

City/State

| SCI Dallas, PA $20,000,000 |
| City of Middletown, NY $12,700,000 |
| City of Reading, PA $3,500,000 |
| Scranton Cultural Center, PA $1,500,000 |

Higher Education

| University of Massachusetts, MA $40,000,000 |
| WPI, MA $6,000,000 |

Dan has been with ESG for seven years.
His representative project (shown) earned the client LEED recognition and was executed with no OSHA violations.

Education

- Rochester Institute of Technology
- BS Science - Energy/Mechanical Engineer
- State University of Farmingdale
- Associate of Applied Science - HVAC/Mechanical Technology
- Professional Certifications and Affiliations
  - Certified Energy Manager
  - Association of Energy Engineers

Employment History

Honeywell International—Three and a half (4) years
- Performed total energy management solution and feasibility study for commercial institutions. Involved with all aspects of business: financing, engineering, installation and maintenance.
- Promoted operational and capital savings, increased current business volume, secured margin.
- Determined profitability of projects, assisted in market planning, and assessed region manning levels.

Johnson Controls—Seven (7) Years
- Accountable for promoting operational and capital savings, increasing current business volume and secured margin.
- Determined profitability of projects, assisted in market planning, and assessed region manning levels. Provided energy, operational cost reduction, and service offering analysis of multiple, complex projects, gathered energy consumption and system efficiency data.

Proprietary & Confidential
Mike Henrich, LEED GA
Senior Project Manager / Experience: 22 years

Responsibilities:
- Implement performance contracts for educational, government, commercial, and industrial facilities.
- Assist in the design of mechanical systems and calculation of energy savings and responsible for estimating equipment and installation cost.
- Maintain knowledge of the latest and highest efficiency equipment and control strategies.
- Develop creative approach and design to gain maximum energy and operational savings for HVAC systems, electrical systems, pneumatics, and industrial process systems through performance contracting.
- Establish and maintain communication and partnerships with customers, subcontractors, and public. Evaluate, select, and manage subcontractors.
- Manage projects and coordinate and develop project schedules and installation strategy. Coordinate project turnover, commissioning, and training.

Professional Certifications and Affiliations:
- MCAA Project Management Courses
- Refrigeration Services Engineers Society Technical School
- Spring Garden College – Construction Management
- ASHRAE Advanced HVAC Course
- JCI Leader Development Training Classes
- JCI Pneumatic Control Training Class
- LEED GA
- Stacy Hanke Inc. Communication with influence

Education

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Brunswick BOE</td>
<td>$16,800,000</td>
</tr>
<tr>
<td>Middlesex BOE</td>
<td>$5,600,000</td>
</tr>
<tr>
<td>Middlesex County VoTech</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Ocean Township Public Schools</td>
<td>$5,300,000</td>
</tr>
<tr>
<td>Milburn BOE</td>
<td>$3,745,213</td>
</tr>
<tr>
<td>Maywood BOE</td>
<td>$2,600,000</td>
</tr>
<tr>
<td>Oradell BOE</td>
<td>$2,400,000</td>
</tr>
<tr>
<td>East Hanover TWIN BOE</td>
<td>$3,200,000</td>
</tr>
<tr>
<td>Salem County VoTech Phase II</td>
<td>$900,000</td>
</tr>
<tr>
<td>Mercer Co. Technical Schools</td>
<td>$12,883,050</td>
</tr>
<tr>
<td>Ridgewood BOE</td>
<td>$7,400,000</td>
</tr>
<tr>
<td>Butler BOE, NJ</td>
<td>$1,624,639</td>
</tr>
<tr>
<td>Paterson Public Schools</td>
<td>$13,050,000</td>
</tr>
<tr>
<td><strong>City/State</strong></td>
<td></td>
</tr>
<tr>
<td>City of Cape May</td>
<td>$900,000</td>
</tr>
<tr>
<td>New Jersey State Police</td>
<td>$6,000,000</td>
</tr>
</tbody>
</table>

Employment History

Johnson Controls—Sixteen (16) years

Operations Manager, 2012 – 2016
Project Manager, 2000 – 2012

Project Management
- PM control from conception through construction to operation
- Prepare budget and monitor costs
- Purchase equipment and materials
- Receive and evaluate subcontractors' proposals
- Write subcontracts
- Prepare and collect monthly progress billings
- Prepare monthly job cost analysis
- Prepare and update Microsoft Project Schedules
- Prepare monthly revenue forecasting reports for AGM

Estimating—Conceptual & Plans and Specifications

Sales Support - Develop capital cost associated with demand-side energy savings opportunities. Participate together with Account Executives and Energy Engineers during the preparation and submission of demand-side energy conservation proposals

Energy Performance Services, Three (3) Years
Senior Project Manager

Johnson Controls—Three (3) Years, Project Manager
James Anderson
SITE SUPERINTENDENT / Experience: 33 Years

Responsibilities
- Direct day to day installation activities
- Provide “Point of Contract” for owners representative
- Supervise and verify subcontractor
- Maintain Effort Hour Log.
- Manage Site Security
- Assist in Design when execution issues arise
- Promote synergy between subcontractors
- Ensure ESG site safety standards are maintained.

Jim has over 33 years of experience in Construction Management, Energy Project Design and implementation. He has experience in the success of over $100 million of projects.

Education

Professional Certifications and Affiliations
- American Society of Healthcare Engineers
- Association of Energy Engineers

Past Projects/Markets

<table>
<thead>
<tr>
<th>Education</th>
<th>Total Contract Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interboro School District PH4</td>
<td>$7,080,000</td>
</tr>
<tr>
<td>City/State</td>
<td></td>
</tr>
<tr>
<td>City of Wilkes-Barr PH1 &amp; PH2</td>
<td>$7,640,000</td>
</tr>
<tr>
<td>City of Pittston PH1 &amp; PH2</td>
<td>$1,640,000</td>
</tr>
<tr>
<td>Delaware Valley Regional Street</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Upper Darby Township</td>
<td>$3,990,000</td>
</tr>
<tr>
<td>Ridley Township</td>
<td>$1,690,000</td>
</tr>
<tr>
<td>City of Coatesville</td>
<td>$1,830,000</td>
</tr>
<tr>
<td>Doylestown Borough</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>City of York PH1 &amp; PH2</td>
<td>$5,700,000</td>
</tr>
<tr>
<td>West Norriton Township</td>
<td>$1,150,000</td>
</tr>
<tr>
<td>Morrisville Borough</td>
<td>$1,560,000</td>
</tr>
<tr>
<td>Upper Chichester Township</td>
<td>$781,514</td>
</tr>
<tr>
<td>West Chester Borough</td>
<td>$940,000</td>
</tr>
<tr>
<td>Bradford County</td>
<td>$3,400,000</td>
</tr>
<tr>
<td>Clinton County</td>
<td>$1,700,000</td>
</tr>
<tr>
<td>Healthcare</td>
<td></td>
</tr>
<tr>
<td>Wernersville State Hospital</td>
<td>$8,400,000</td>
</tr>
<tr>
<td>Penn State Hershey Medical Center</td>
<td>$3,400,000</td>
</tr>
</tbody>
</table>

Employment History

- JA Contracting: Owner
  Eastern Pennsylvania (2018 – Present)
- Johnson Controls, Inc.:
- Mechanical & Electrical Contractor: Owner
Tahiya McCoy Nyahuma, Ph.D.  (3000 market St. #202 Phila., PA 19104)

HealthLink International / Chief Operating Office / 22 years

Responsibilities
- Managed Project Development - selection, supervision and evaluation of staff, and operational and budget controls
- Coordinate comprehensive fundraising and education programs
- Arranged special events and special event fundraisers
- Met with government officials, corporate heads, international and individual donors
- Represented the organization to its constituents and public as its spokesperson
- Develop, review and monitor curriculum
- Conduct weekly reviews of students’ progress

Tahiya has over 20 years of project management, teaching and community economic development experience. She has directed and managed economic development projects in the Philadelphia region as well as in Africa and Europe. She has extensive experience providing training solutions for underserved populations.

Education & Certification
- Ph.D. Political Science - International Relations, Comparative Politics, Global Governance, University of Ghana, Accra, Ghana
- M.A. Political Science - International Relations and Comparative Politics, State University of New York, Binghamton, New York.
- B.A. English - Comparative Literature and Composition and Education, Windham College, Putney, Vermont.
- Research Associate—School of Economics & Political Science, School of Oriental & African Studies, London, University, England
- Certificate—French Language & Culture, Universite de Portier de Tours, France.

Employment History

Chief Operating Officer HEALTHLINK INTERNATIONAL Career Development and High School Health/STEM Career and College Exposure Program, Phila. PA

Qualitative Research Team Leader ILC AFRICA – GHANA, Accra, Ghana
Provided quality assurance, compliance training, supervision of professional/technical staff for evaluations.

Visiting Professor NORTH CAROLINA A&T STATE UNIVERSITY, Greensboro, NC Political Science and Public Policy, Women’s Gender & Sexuality

Project Management/Sociologist OPPORTUNITIES INDUSTRIALIZATION CENTERS INTERNATIONAL (OIC), Accra-North, Ghana
Conduct a livelihood and Gender study of target populations residing within Newmont Ghana Gold Ltd (NGGL) Ahao South Mine Lease area; Supervised three (3) support staff and ten (10) project staff.

Adjunct Professor, Political Science, CHEYNEY UNIVERSITY, Cheyney, PA Political Science, State & Local Gov’t.

Adjunct Professor, Political Science, ROWAN UNIVERSITY, Glassboro, NJ American Government, Global Studies

Proprietary & Confidential
Donna Wicks, CMVP  
Measurement and Verification Manager

Donna is the Measurement and Verification (M&V) Manager for Energy Systems Group’s Public Sector division.

Role & Responsibility
In her role as Manager of M&V, Donna manages and tracks each programs’ guaranteed energy savings. She does so in order to fulfill the final step of the performance contract. Donna works closely with ESG’s engineering and business development teams to ensure customer satisfaction. She works on the constant development of quality-driven measurement and verification solutions and customer reports.

Experience & Qualifications
Donna has worked in Energy System Group’s Corporate office since she joined the company in June 1997. She worked in several positions before being promoted to Manager of Measurement and Verification in May 2008. She has over 25 years of experience collecting, analyzing, and generating customer reports in the marketing research, financial management, and measurement and verification areas. As an Operations Manager for Research Systems Corporation from 1998 to 1993, Donna managed multiple departments located onsite as well as throughout the United States and Canada. As a Collections Supervisor for American General Finance Corporation from 1994-1997, she wrote monthly executive summaries detailing how a multimillion-dollar department performed versus how it was forecasted to do. At both companies, Donna worked directly with customers on any issues or concerns to expedite resolution and ensure customer satisfaction.
Section 6: Financial Justification

Detailed financial information shall be required, as follows:

6.6.1 Type and source of financing, should the Township consider ESCO financing.

6.6.2 Interest rate (including any associated annual fees/costs.) For purposes of this PC, use a 3% rate with lease payments not to exceed total savings in any year. Note: the Township reserves the option to finance this contract directly from available funds.

6.6.3 Cash flow analysis. Note: Provide separate line items for electric, fossil fuel and each O&M savings (as appropriate). Provide a separate line item for annual M&V costs.

6.6.4 Include separate submission of proposed individual ECMs/FIMs costs with corresponding energy and operational cost savings in electronic format as indicated in the Addendum.

6.6.5 If proposing substantial lighting upgrades, submit the lighting line-by-line spreadsheets in electronic format.

6.6.6 The term of the proposed agreement. Proposals should be structured with both 15 and 20-year terms.

6.6.7 A guarantee of annual energy savings in energy units and dollars.

6.6.8 Any other terms of information relevant to the financial aspects of the proposed transaction.

6.7 ESCO must agree to guarantee any proposal pricing and/or contract terms for a period of ninety (90) days from the proposal due date.
Section 6: Financial Justification

Type and Source of Financing

Financing is a critical aspect of the performance contracts provided by Energy Systems Group. The essence of our business is that projects pay for themselves through savings, and we are accustomed to assisting customers in structuring the financing so that it is “funded” through savings generated by the project.

In most cases, we assist our customers by helping to arrange the financing, sometimes working with a customer’s financial advisor. (ESG is not a financial advisor.) We routinely help conduct financing solicitations with and for our customers, making sure that competition produces the best deal for our customer. ESG has in-house financing expertise that is available to assist customers with project financing as a service.

Most of ESG’s projects are funded through “private placements” of tax-exempt financing. A number of national and regional banks specialize in this type of lending, and they are familiar with the unique aspects of performance contract financing. Normally single-investor financings, these transactions are often structured as lease-purchase agreements, and sometimes as installment purchase agreements. Typical repayment terms are 20 years following the project implementation, and the financing serves as both construction financing as well as “permanent” financing. At the time of contract signing, the lender deposits project funds in an escrow account, and ESG receives monthly draws with customer authorization as the project is implemented. Customer repayment is timed to begin after the project is fully implemented. Current interest rates for 15-year tax-exempt lease-purchase agreements are approximately 3.50% to 4%.

Customer repayment is normally set up on a semi-annual schedule, but annual or quarterly payments can also be arranged. Title to the ECMs (ownership) normally passes to the customer on installation and acceptance. The lender takes a security interest in the ECMs by filing a UCC-1 financing statement. As a rule, no other collateral is required.

As mentioned, most of our projects with state and local government entities are financed through lease-purchase or installment purchase agreements. These financial products are offered by various national and regional banks. Some customers elect to finance their projects through general obligation bonds, and in some cases through revenue bonds (such as a project for a wastewater treatment plant). Various investment banks or bond houses underwrite and provide these types of bonds for energy efficiency or sustainability projects.
Cash Flow Analysis

We have provided a cash flow analysis for each project option.

Option 1a – Recommended Package: 15-year cash flow
Option 1b – Recommended Package: 20-year cash flow
Option 2a – Core Enhancement: 15-year cash flow
Option 2b – Core Enhancement: 20-year cash flow
Option 3a – All Measures: 15-year cash flow
Option 3b – All Measures: 20-year cash flow

Note: 3 years of M&V are included in each option

Term

ESG proposes a payback term of 15 years for option 1 and a payback term of 20 years for option 2 in accordance with Act 39, the guaranteed energy savings act of PA. The 20 year contract term allows the maximum amount of infrastructure improvements to be funded by savings. Other terms can be developed with input from the township. There is a trade-off between excess savings developed and constriction of the contract term. The final contract term will be developed as directed by the townships management staff.

Section 6.7: ESCO Guarantee

ESCO agrees to guarantee our proposal pricing and/or contract terms for a period of ninety (90) days from the opening of the proposal.
## Lower Merion Township / PA Guaranteed Energy Savings Act
### Response to Request for Proposals for an Energy/Operating Cost Reduction Program

**Option 1 – Recommended Package**

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot;</th>
<th>Ardmore Ave Pool Complex</th>
<th>Ardmore Community Center</th>
<th>Ardmore Library</th>
<th>Bala Cynwyd Library</th>
<th>Belmont Community Center</th>
<th>Belmont Hills Pool Complex</th>
<th>Bryn Mawr Community Center</th>
<th>County Line Complex</th>
<th>Domestic Animal Detention Center (Koegel Complex)</th>
<th>Fleet</th>
<th>Highways</th>
<th>Ludington Library</th>
<th>PALA Building</th>
<th>Penn Wynne Library</th>
<th>Public Safety Building</th>
<th>Street Lights</th>
<th>Township Administration Building</th>
<th>Vernon Young</th>
<th>Warmer Ave (Park)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDG ENV</td>
<td>Attic Insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Building Sealing &amp; weatherization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Install Air Curtain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Window Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements - Condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements (Furnace)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWH w/ CONTROLS</td>
<td>DHW Heater Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HWP w/ CONTROLS</td>
<td>Motor Replacement (Pool Pump)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wallpacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - HID</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>LED Atrium Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Center</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Cobra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTU w/ CONTROLS</td>
<td>RTU Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPLIT w/ CONTROLS</td>
<td>DX Unit Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Lower Merion Township / PA Guaranteed Energy Savings Act
### Response to Request for Proposals for an Energy/Operating Cost Reduction Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$261,845</td>
<td>$0</td>
<td>$54,070</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$985,567</td>
<td>$0</td>
<td>$0</td>
<td>$985,567</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$267,082</td>
<td>$0</td>
<td>$55,692</td>
<td>$277,651</td>
<td>$26,133</td>
<td>$626,559</td>
<td>$626,559</td>
<td>$0</td>
<td>$626,559</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$272,424</td>
<td>$0</td>
<td>$57,363</td>
<td>$0</td>
<td>$26,133</td>
<td>$355,920</td>
<td>$355,920</td>
<td>$0</td>
<td>$355,920</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$277,872</td>
<td>$0</td>
<td>$59,084</td>
<td>$0</td>
<td>$26,133</td>
<td>$363,089</td>
<td>$363,089</td>
<td>$0</td>
<td>$363,089</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$283,430</td>
<td>$0</td>
<td>$60,856</td>
<td>$0</td>
<td>$26,133</td>
<td>$370,419</td>
<td>$370,419</td>
<td>$0</td>
<td>$370,419</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$289,098</td>
<td>$0</td>
<td>$62,682</td>
<td>$0</td>
<td>$26,133</td>
<td>$377,914</td>
<td>$377,914</td>
<td>$0</td>
<td>$377,914</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$294,880</td>
<td>$0</td>
<td>$64,562</td>
<td>$0</td>
<td>$26,133</td>
<td>$385,576</td>
<td>$385,576</td>
<td>$0</td>
<td>$385,576</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$300,778</td>
<td>$0</td>
<td>$66,499</td>
<td>$0</td>
<td>$26,133</td>
<td>$393,410</td>
<td>$393,410</td>
<td>$0</td>
<td>$393,410</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$306,793</td>
<td>$0</td>
<td>$68,494</td>
<td>$0</td>
<td>$26,133</td>
<td>$401,421</td>
<td>$401,421</td>
<td>$0</td>
<td>$401,421</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$312,929</td>
<td>$0</td>
<td>$70,549</td>
<td>$0</td>
<td>$26,133</td>
<td>$409,612</td>
<td>$409,612</td>
<td>$0</td>
<td>$409,612</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$319,188</td>
<td>$0</td>
<td>$72,666</td>
<td>$0</td>
<td>$26,133</td>
<td>$417,987</td>
<td>$417,987</td>
<td>$0</td>
<td>$417,987</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$325,572</td>
<td>$0</td>
<td>$74,846</td>
<td>$0</td>
<td>$26,133</td>
<td>$426,550</td>
<td>$426,550</td>
<td>$0</td>
<td>$426,550</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$332,083</td>
<td>$0</td>
<td>$77,091</td>
<td>$0</td>
<td>$26,133</td>
<td>$435,307</td>
<td>$435,307</td>
<td>$0</td>
<td>$435,307</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>$338,725</td>
<td>$0</td>
<td>$79,404</td>
<td>$0</td>
<td>$26,133</td>
<td>$444,262</td>
<td>$444,262</td>
<td>$0</td>
<td>$444,262</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>$345,499</td>
<td>$0</td>
<td>$81,786</td>
<td>$0</td>
<td>$26,133</td>
<td>$453,418</td>
<td>$453,418</td>
<td>$0</td>
<td>$453,418</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>$352,409</td>
<td>$0</td>
<td>$84,239</td>
<td>$0</td>
<td>$26,133</td>
<td>$462,782</td>
<td>$462,782</td>
<td>$0</td>
<td>$462,782</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>AGGREGATE</td>
<td>$4,733,505</td>
<td>$0</td>
<td>$1,035,813</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$6,438,969</td>
<td>$4,689,338</td>
<td>$0</td>
<td>$4,689,338</td>
<td>$1,749,632</td>
</tr>
</tbody>
</table>

Energy & Interest Rates as per RFP
### Lower Merion Township / PA Guaranteed Energy Savings Act

**Response to Request for Proposals for an Energy/Operating Cost Reduction Program**

**Project Value** $3,567,567

**Total Financed Amount** $3,763,783

#### Option 1b: 20 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$261,845</td>
<td>$0</td>
<td>$54,070</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$985,567</td>
<td>$0</td>
<td>$0</td>
<td>$985,567</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$287,082</td>
<td>$0</td>
<td>$55,692</td>
<td>$277,651</td>
<td>$19,600</td>
<td>$620,026</td>
<td></td>
<td>$0</td>
<td>$620,026</td>
<td>$0</td>
</tr>
<tr>
<td>2</td>
<td>$272,424</td>
<td>$0</td>
<td>$57,363</td>
<td>$0</td>
<td>$19,600</td>
<td>$349,387</td>
<td></td>
<td>$0</td>
<td>$349,387</td>
<td>$0</td>
</tr>
<tr>
<td>3</td>
<td>$277,872</td>
<td>$0</td>
<td>$59,084</td>
<td>$0</td>
<td>$19,600</td>
<td>$356,556</td>
<td></td>
<td>$0</td>
<td>$356,556</td>
<td>$0</td>
</tr>
<tr>
<td>4</td>
<td>$283,430</td>
<td>$0</td>
<td>$60,856</td>
<td>$0</td>
<td>$19,600</td>
<td>$363,866</td>
<td></td>
<td>$0</td>
<td>$363,866</td>
<td>$0</td>
</tr>
<tr>
<td>5</td>
<td>$289,098</td>
<td>$0</td>
<td>$62,682</td>
<td>$0</td>
<td>$19,600</td>
<td>$371,380</td>
<td></td>
<td>$0</td>
<td>$371,380</td>
<td>$0</td>
</tr>
<tr>
<td>6</td>
<td>$294,880</td>
<td>$0</td>
<td>$64,562</td>
<td>$0</td>
<td>$19,600</td>
<td>$379,043</td>
<td></td>
<td>$0</td>
<td>$379,043</td>
<td>$0</td>
</tr>
<tr>
<td>7</td>
<td>$300,778</td>
<td>$0</td>
<td>$66,499</td>
<td>$0</td>
<td>$19,600</td>
<td>$386,877</td>
<td></td>
<td>$0</td>
<td>$386,877</td>
<td>$0</td>
</tr>
<tr>
<td>8</td>
<td>$306,793</td>
<td>$0</td>
<td>$68,494</td>
<td>$0</td>
<td>$19,600</td>
<td>$394,888</td>
<td></td>
<td>$0</td>
<td>$394,888</td>
<td>$0</td>
</tr>
<tr>
<td>9</td>
<td>$312,929</td>
<td>$0</td>
<td>$70,549</td>
<td>$0</td>
<td>$19,600</td>
<td>$403,078</td>
<td></td>
<td>$0</td>
<td>$403,078</td>
<td>$0</td>
</tr>
<tr>
<td>10</td>
<td>$319,188</td>
<td>$0</td>
<td>$72,666</td>
<td>$0</td>
<td>$19,600</td>
<td>$411,453</td>
<td></td>
<td>$0</td>
<td>$411,453</td>
<td>$0</td>
</tr>
<tr>
<td>11</td>
<td>$325,572</td>
<td>$0</td>
<td>$74,846</td>
<td>$0</td>
<td>$19,600</td>
<td>$420,017</td>
<td></td>
<td>$0</td>
<td>$420,017</td>
<td>$0</td>
</tr>
<tr>
<td>12</td>
<td>$332,083</td>
<td>$0</td>
<td>$77,091</td>
<td>$0</td>
<td>$19,600</td>
<td>$428,774</td>
<td></td>
<td>$0</td>
<td>$428,774</td>
<td>$181,705</td>
</tr>
<tr>
<td>13</td>
<td>$338,725</td>
<td>$0</td>
<td>$79,404</td>
<td>$0</td>
<td>$19,600</td>
<td>$437,728</td>
<td></td>
<td>$0</td>
<td>$437,728</td>
<td>$0</td>
</tr>
<tr>
<td>14</td>
<td>$345,499</td>
<td>$0</td>
<td>$81,786</td>
<td>$0</td>
<td>$19,600</td>
<td>$446,885</td>
<td></td>
<td>$0</td>
<td>$446,885</td>
<td>$0</td>
</tr>
<tr>
<td>15</td>
<td>$352,409</td>
<td>$0</td>
<td>$84,239</td>
<td>$0</td>
<td>$19,600</td>
<td>$456,248</td>
<td></td>
<td>$0</td>
<td>$456,248</td>
<td>$0</td>
</tr>
<tr>
<td>16</td>
<td>$359,457</td>
<td>$0</td>
<td>$86,766</td>
<td>$0</td>
<td>$19,600</td>
<td>$465,824</td>
<td></td>
<td>$0</td>
<td>$465,824</td>
<td>$0</td>
</tr>
<tr>
<td>17</td>
<td>$366,646</td>
<td>$0</td>
<td>$89,369</td>
<td>$0</td>
<td>$19,600</td>
<td>$475,616</td>
<td></td>
<td>$0</td>
<td>$475,616</td>
<td>$0</td>
</tr>
<tr>
<td>18</td>
<td>$373,979</td>
<td>$0</td>
<td>$92,051</td>
<td>$0</td>
<td>$19,600</td>
<td>$485,630</td>
<td></td>
<td>$0</td>
<td>$485,630</td>
<td>$0</td>
</tr>
<tr>
<td>19</td>
<td>$381,459</td>
<td>$0</td>
<td>$94,812</td>
<td>$0</td>
<td>$19,600</td>
<td>$495,871</td>
<td></td>
<td>$0</td>
<td>$495,871</td>
<td>$0</td>
</tr>
<tr>
<td>20</td>
<td>$389,088</td>
<td>$0</td>
<td>$97,856</td>
<td>$0</td>
<td>$19,600</td>
<td>$506,348</td>
<td></td>
<td>$0</td>
<td>$506,348</td>
<td>$0</td>
</tr>
<tr>
<td><strong>AGGREGATE</strong></td>
<td>$6,604,136</td>
<td>$0</td>
<td>$1,496,468</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$4,703,659</td>
<td></td>
<td>$0</td>
<td>$4,703,659</td>
<td>$4,066,596</td>
</tr>
</tbody>
</table>

Energy & Interest Rates as per RFP
## Lower Merion Township / PA Guaranteed Energy Savings Act
### Response to Request for Proposals for an Energy/Operating Cost Reduction Program

### Option 2 – Core Enhancement

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
<th>Ardmore Ave Pool Complex</th>
<th>Ardmore Community Center</th>
<th>Bala Cynwyd Library</th>
<th>Belmont Community Center</th>
<th>Belmont Hills Pool Complex</th>
<th>Bryn Mawr Community Center</th>
<th>County Line Complex</th>
<th>Domestic Animal Detention Center (Kohler Complex)</th>
<th>Fleet</th>
<th>Highways</th>
<th>Ludington Library</th>
<th>PALA Building</th>
<th>Penn Wynne Library</th>
<th>Public Safety Building</th>
<th>Township Administration Building</th>
<th>Vernon Young</th>
<th>Warner Ave (Park)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BLDG ENV</strong></td>
<td>Attic Insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLDG ENV</strong></td>
<td>Building Sealing &amp; weatherization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLDG ENV</strong></td>
<td>Install Air Curtain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLDG ENV</strong></td>
<td>Window Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BOILER w/ CONTROLS</strong></td>
<td>Boiler Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BOILER w/ CONTROLS</strong></td>
<td>Boiler Replacements - Condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BOILER w/ CONTROLS</strong></td>
<td>Boiler Replacements (Furnace)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHILLER w/ CONTROLS</strong></td>
<td>Chiller Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONTROLS</strong></td>
<td>New Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONTROLS</strong></td>
<td>Update Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DWH w/ CONTROLS</strong></td>
<td>DHW Heater Replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HWP w/ CONTROLS</strong></td>
<td>Motor Replacement (Pool Pump)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: EXT</strong></td>
<td>LED Parking Lot Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: EXT</strong></td>
<td>LED Site Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: EXT</strong></td>
<td>LED Site Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: EXT</strong></td>
<td>LED Wallpacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: INT</strong></td>
<td>Interior LED Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: INT</strong></td>
<td>Interior LED Lighting - Completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: INT</strong></td>
<td>Interior LED Lighting - HID</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: INT</strong></td>
<td>LED Atrium Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Center</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Cobra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Colonial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIGHTING: STREET</strong></td>
<td>Street Lighting Audit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RECOMM</strong></td>
<td>Recommission Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RECOMM</strong></td>
<td>Recommission Controls &amp; Air Side Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RECOMM</strong></td>
<td>Recommission Controls &amp; Boiler Plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RTU w/ CONTROLS</strong></td>
<td>RTU Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SPLIT w/ CONTROLS</strong></td>
<td>DX Unit Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Project Value: $3,593,251  
Total Financed Amount: $3,790,880

<table>
<thead>
<tr>
<th>Option 2a: 15 years</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>CIP Total</th>
<th>Loan Payment</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$261,845</td>
<td>$0</td>
<td>$54,070</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$985,567</td>
<td>$0</td>
<td>$0</td>
<td>$985,567</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$267,082</td>
<td>$0</td>
<td>$55,692</td>
<td>$277,651</td>
<td>$26,133</td>
<td>$626,559</td>
<td>$0</td>
<td>$0</td>
<td>$626,559</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$272,424</td>
<td>$0</td>
<td>$57,363</td>
<td>$0</td>
<td>$26,133</td>
<td>$355,920</td>
<td>$0</td>
<td>$0</td>
<td>$355,920</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$277,872</td>
<td>$0</td>
<td>$59,084</td>
<td>$0</td>
<td>$26,133</td>
<td>$363,089</td>
<td>$0</td>
<td>$0</td>
<td>$363,089</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$283,330</td>
<td>$0</td>
<td>$60,856</td>
<td>$0</td>
<td>$26,133</td>
<td>$370,419</td>
<td>$0</td>
<td>$0</td>
<td>$370,419</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$289,098</td>
<td>$0</td>
<td>$62,682</td>
<td>$0</td>
<td>$26,133</td>
<td>$377,914</td>
<td>$0</td>
<td>$0</td>
<td>$377,914</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$294,880</td>
<td>$0</td>
<td>$64,562</td>
<td>$0</td>
<td>$26,133</td>
<td>$385,576</td>
<td>$0</td>
<td>$0</td>
<td>$385,576</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$300,778</td>
<td>$0</td>
<td>$66,499</td>
<td>$0</td>
<td>$26,133</td>
<td>$393,410</td>
<td>$0</td>
<td>$0</td>
<td>$393,410</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$306,793</td>
<td>$0</td>
<td>$68,494</td>
<td>$0</td>
<td>$26,133</td>
<td>$401,421</td>
<td>$0</td>
<td>$0</td>
<td>$401,421</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$312,929</td>
<td>$0</td>
<td>$70,549</td>
<td>$0</td>
<td>$26,133</td>
<td>$409,612</td>
<td>$0</td>
<td>$0</td>
<td>$409,612</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$319,188</td>
<td>$0</td>
<td>$72,666</td>
<td>$0</td>
<td>$26,133</td>
<td>$417,987</td>
<td>$0</td>
<td>$0</td>
<td>$417,987</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$325,572</td>
<td>$0</td>
<td>$74,846</td>
<td>$0</td>
<td>$26,133</td>
<td>$426,550</td>
<td>$0</td>
<td>$0</td>
<td>$426,550</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$332,083</td>
<td>$0</td>
<td>$77,091</td>
<td>$0</td>
<td>$26,133</td>
<td>$435,419</td>
<td>$0</td>
<td>$0</td>
<td>$435,419</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>$338,725</td>
<td>$0</td>
<td>$79,404</td>
<td>$0</td>
<td>$26,133</td>
<td>$444,262</td>
<td>$0</td>
<td>$0</td>
<td>$444,262</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>$345,499</td>
<td>$0</td>
<td>$81,786</td>
<td>$0</td>
<td>$26,133</td>
<td>$453,418</td>
<td>$0</td>
<td>$0</td>
<td>$453,418</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>$352,409</td>
<td>$0</td>
<td>$84,239</td>
<td>$0</td>
<td>$26,133</td>
<td>$462,782</td>
<td>$0</td>
<td>$0</td>
<td>$462,782</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGGREGATE</td>
<td>$4,733,505</td>
<td>$0</td>
<td>$1,035,813</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$6,438,969</td>
<td>$4,729,748</td>
<td>$0</td>
<td>$4,729,748</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Energy & Interest Rates as per RFP
### Lower Merion Township / PA Guaranteed Energy Savings Act

**Response to Request for Proposals for an Energy/Operating Cost Reduction Program**

**Project Value** $3,593,251  
**Total Financed Amount** $3,790,880

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$261,845</td>
<td>$0</td>
<td>$54,070</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$985,567</td>
<td>$0</td>
<td>$0</td>
<td>$985,567</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$114,743</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$267,082</td>
<td>$0</td>
<td>$55,692</td>
<td>$277,651</td>
<td>$19,600</td>
<td>$620,026</td>
<td>$0</td>
<td>$0</td>
<td>$620,026</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$272,424</td>
<td>$0</td>
<td>$57,363</td>
<td>$0</td>
<td>$19,600</td>
<td>$349,387</td>
<td>$0</td>
<td>$0</td>
<td>$349,387</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$277,872</td>
<td>$0</td>
<td>$59,084</td>
<td>$0</td>
<td>$19,600</td>
<td>$356,556</td>
<td>$0</td>
<td>$0</td>
<td>$356,556</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$283,430</td>
<td>$0</td>
<td>$60,856</td>
<td>$19,600</td>
<td>$363,886</td>
<td>$363,886</td>
<td>$0</td>
<td>$0</td>
<td>$363,886</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$289,098</td>
<td>$0</td>
<td>$62,682</td>
<td>$19,600</td>
<td>$371,380</td>
<td>$371,380</td>
<td>$0</td>
<td>$0</td>
<td>$371,380</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$294,880</td>
<td>$0</td>
<td>$64,562</td>
<td>$19,600</td>
<td>$379,043</td>
<td>$379,043</td>
<td>$0</td>
<td>$0</td>
<td>$379,043</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$300,778</td>
<td>$0</td>
<td>$66,499</td>
<td>$19,600</td>
<td>$386,877</td>
<td>$386,877</td>
<td>$0</td>
<td>$0</td>
<td>$386,877</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$306,793</td>
<td>$0</td>
<td>$68,494</td>
<td>$19,600</td>
<td>$394,888</td>
<td>$394,888</td>
<td>$0</td>
<td>$0</td>
<td>$394,888</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$312,929</td>
<td>$0</td>
<td>$70,549</td>
<td>$19,600</td>
<td>$403,078</td>
<td>$403,078</td>
<td>$0</td>
<td>$0</td>
<td>$403,078</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$319,188</td>
<td>$0</td>
<td>$72,666</td>
<td>$19,600</td>
<td>$411,453</td>
<td>$411,453</td>
<td>$0</td>
<td>$0</td>
<td>$411,453</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$325,572</td>
<td>$0</td>
<td>$74,846</td>
<td>$19,600</td>
<td>$420,171</td>
<td>$420,171</td>
<td>$0</td>
<td>$0</td>
<td>$420,171</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$332,083</td>
<td>$0</td>
<td>$77,091</td>
<td>$19,600</td>
<td>$428,774</td>
<td>$287,479</td>
<td>$0</td>
<td>$0</td>
<td>$287,479</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>$338,725</td>
<td>$0</td>
<td>$79,404</td>
<td>$19,600</td>
<td>$437,728</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$437,728</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>$345,499</td>
<td>$0</td>
<td>$81,786</td>
<td>$19,600</td>
<td>$446,885</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$446,885</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>$352,409</td>
<td>$0</td>
<td>$84,239</td>
<td>$19,600</td>
<td>$456,248</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$456,248</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>$359,457</td>
<td>$0</td>
<td>$86,766</td>
<td>$19,600</td>
<td>$465,824</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$465,824</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>$366,646</td>
<td>$0</td>
<td>$89,389</td>
<td>$19,600</td>
<td>$475,616</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$475,616</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>$373,979</td>
<td>$0</td>
<td>$92,051</td>
<td>$19,600</td>
<td>$485,630</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$485,630</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>$381,459</td>
<td>$0</td>
<td>$94,812</td>
<td>$19,600</td>
<td>$495,871</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$495,871</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>$389,088</td>
<td>$0</td>
<td>$97,656</td>
<td>$19,600</td>
<td>$506,345</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$506,345</td>
<td></td>
</tr>
<tr>
<td>AGGREGATE</td>
<td>$6,604,136</td>
<td>$0</td>
<td>$1,496,468</td>
<td>$277,651</td>
<td>$392,000</td>
<td>$8,770,255</td>
<td>$4,744,069</td>
<td>$0</td>
<td>$4,744,069</td>
<td></td>
</tr>
</tbody>
</table>

Energy & Interest Rates as per RFP

**Option 2b: 20 years**
## Lower Merion Township / PA Guaranteed Energy Savings Act
Response to Request for Proposals for an Energy/Operating Cost Reduction Program

### Option 3 – All Measures

<table>
<thead>
<tr>
<th>ECM Type</th>
<th>Energy Conservation Measure &quot;ECM&quot; Description</th>
<th>Ardmore Ave Pool Complex</th>
<th>Ardmore Community Center</th>
<th>Ardmore Library</th>
<th>Bala Cynwyd Library</th>
<th>Belmont Community Center</th>
<th>Belmont Hills Pool Complex</th>
<th>Bry-Mount Community Center</th>
<th>County Line Complex</th>
<th>Domestic Animal Detention Center (Koegel Complex)</th>
<th>Fleet</th>
<th>Highways</th>
<th>Ludington Library</th>
<th>PALM Building</th>
<th>Penn Wynne Library</th>
<th>Public Safety Building</th>
<th>Street Lights</th>
<th>Township Administration Building</th>
<th>Vernon Young</th>
<th>Warner Ave (Park)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLDG ENV</td>
<td>Attic Insulation</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Building Sealing &amp; weatherization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Install Air Curtain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLDG ENV</td>
<td>Window Replacements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements - Condensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOILER w/ CONTROLS</td>
<td>Boiler Replacements (Furnace)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHILLER w/ CONTROLS</td>
<td>Chiller Replacement</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>New Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Update Controls</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DWH w/ CONTROLS</td>
<td>DWH Heater Replacement</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HWP w/ CONTROLS</td>
<td>Motor Replacement (Pool Pump)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Parking Lot Lighting</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Site Lighting - Completed</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: EXT</td>
<td>LED Wallpacks</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: INT</td>
<td>Interior LED Lighting - Completed</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Center</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Colonial</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Controls</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIGHTING: STREET</td>
<td>Street Lighting Audit</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Air Side Systems</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMM</td>
<td>Recommission Controls &amp; Boiler Plant</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTU w/ CONTROLS</td>
<td>RTU Replacements</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPLIT w/ CONTROLS</td>
<td>DX Unit Replacements</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Lower Merion Township / PA Guaranteed Energy Savings Act

## Response to Request for Proposals for an Energy/Operating Cost Reduction Program

### Project Value

$5,106,328

### Total Financed Amount

$3,387,177

## Option 3a: 15 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$284,550</td>
<td>$0</td>
<td>$54,070</td>
<td>$304,651</td>
<td>$522,000</td>
<td>$1,165,272</td>
<td>$9,867</td>
<td>$0</td>
<td>$1,165,272</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$124,856</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$124,856</td>
<td>$0</td>
<td>$0</td>
<td>$124,856</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$290,241</td>
<td>$0</td>
<td>$55,692</td>
<td>$304,651</td>
<td>$34,800</td>
<td>$685,385</td>
<td>$675,518</td>
<td>$9,867</td>
<td>$685,385</td>
<td>$0</td>
</tr>
<tr>
<td>2</td>
<td>$296,046</td>
<td>$0</td>
<td>$57,363</td>
<td>$0</td>
<td>$34,800</td>
<td>$388,209</td>
<td>$378,342</td>
<td>$9,867</td>
<td>$388,209</td>
<td>$0</td>
</tr>
<tr>
<td>3</td>
<td>$301,967</td>
<td>$0</td>
<td>$59,084</td>
<td>$0</td>
<td>$34,800</td>
<td>$395,851</td>
<td>$385,984</td>
<td>$9,867</td>
<td>$395,851</td>
<td>$0</td>
</tr>
<tr>
<td>4</td>
<td>$308,006</td>
<td>$0</td>
<td>$60,562</td>
<td>$0</td>
<td>$34,800</td>
<td>$403,663</td>
<td>$393,796</td>
<td>$9,867</td>
<td>$403,663</td>
<td>$0</td>
</tr>
<tr>
<td>5</td>
<td>$314,166</td>
<td>$0</td>
<td>$62,682</td>
<td>$0</td>
<td>$34,800</td>
<td>$411,648</td>
<td>$401,781</td>
<td>$9,867</td>
<td>$411,648</td>
<td>$0</td>
</tr>
<tr>
<td>6</td>
<td>$320,450</td>
<td>$0</td>
<td>$64,562</td>
<td>$0</td>
<td>$34,800</td>
<td>$419,812</td>
<td>$409,945</td>
<td>$9,867</td>
<td>$419,812</td>
<td>$0</td>
</tr>
<tr>
<td>7</td>
<td>$326,859</td>
<td>$0</td>
<td>$66,499</td>
<td>$0</td>
<td>$34,800</td>
<td>$428,158</td>
<td>$418,291</td>
<td>$9,867</td>
<td>$428,158</td>
<td>$0</td>
</tr>
<tr>
<td>8</td>
<td>$333,396</td>
<td>$0</td>
<td>$68,494</td>
<td>$0</td>
<td>$34,800</td>
<td>$436,890</td>
<td>$426,623</td>
<td>$9,867</td>
<td>$436,690</td>
<td>$0</td>
</tr>
<tr>
<td>9</td>
<td>$340,064</td>
<td>$0</td>
<td>$70,549</td>
<td>$0</td>
<td>$34,800</td>
<td>$445,413</td>
<td>$435,546</td>
<td>$9,867</td>
<td>$445,413</td>
<td>$0</td>
</tr>
<tr>
<td>10</td>
<td>$346,865</td>
<td>$0</td>
<td>$72,666</td>
<td>$0</td>
<td>$34,800</td>
<td>$453,331</td>
<td>$444,464</td>
<td>$9,867</td>
<td>$454,331</td>
<td>$0</td>
</tr>
<tr>
<td>11</td>
<td>$353,802</td>
<td>$0</td>
<td>$74,846</td>
<td>$0</td>
<td>$34,800</td>
<td>$463,448</td>
<td>$453,581</td>
<td>$9,867</td>
<td>$463,448</td>
<td>$0</td>
</tr>
<tr>
<td>12</td>
<td>$360,879</td>
<td>$0</td>
<td>$77,091</td>
<td>$0</td>
<td>$34,800</td>
<td>$472,769</td>
<td>$462,902</td>
<td>$9,867</td>
<td>$472,769</td>
<td>$0</td>
</tr>
<tr>
<td>13</td>
<td>$368,096</td>
<td>$0</td>
<td>$79,404</td>
<td>$0</td>
<td>$34,800</td>
<td>$482,300</td>
<td>$472,433</td>
<td>$9,867</td>
<td>$482,300</td>
<td>$0</td>
</tr>
<tr>
<td>14</td>
<td>$375,458</td>
<td>$0</td>
<td>$81,786</td>
<td>$0</td>
<td>$34,800</td>
<td>$492,044</td>
<td>$482,177</td>
<td>$9,867</td>
<td>$492,044</td>
<td>$0</td>
</tr>
<tr>
<td>15</td>
<td>$382,967</td>
<td>$0</td>
<td>$84,239</td>
<td>$0</td>
<td>$34,800</td>
<td>$502,006</td>
<td>$492,888</td>
<td>$9,867</td>
<td>$492,888</td>
<td>$0</td>
</tr>
<tr>
<td>16</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>17</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>18</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>19</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>20</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

## AGGREGATE

| $5,144,118 | $0 | $1,035,813 | $304,651 | $522,000 | $7,006,582 | $7,166,470 | $148,005 | $7,316,475 | -$309,893 |

Energy & Interest Rates as per RFP
### Lower Merion Township / PA Guaranteed Energy Savings Act

**Response to Request for Proposals for an Energy/Operating Cost Reduction Program**

- **Project Value**: $5,106,328
- **Total Financed Amount**: $5,387,177

#### Option 3b: 20 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Energy Savings</th>
<th>Agreed Upon Annual Savings</th>
<th>Annual Operational Savings</th>
<th>Energy Rebates / Incentives</th>
<th>CIP</th>
<th>Total</th>
<th>Loan Payment</th>
<th>Wireless Controls</th>
<th>Total Costs</th>
<th>Net Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>$284,550</td>
<td>$0</td>
<td>$54,070</td>
<td>$304,651</td>
<td>$522,000</td>
<td>$1,165,272</td>
<td>$9,867</td>
<td>$0</td>
<td>$1,165,272</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$124,856</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$124,856</td>
<td>$0</td>
<td>$0</td>
<td>$124,856</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$290,241</td>
<td>$0</td>
<td>$55,692</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$676,685</td>
<td>$666,818</td>
<td>$9,867</td>
<td>$676,685</td>
<td>$0</td>
</tr>
<tr>
<td>2</td>
<td>$296,046</td>
<td>$0</td>
<td>$57,363</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$397,509</td>
<td>$369,642</td>
<td>$9,867</td>
<td>$397,509</td>
<td>$0</td>
</tr>
<tr>
<td>3</td>
<td>$301,967</td>
<td>$0</td>
<td>$59,084</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$387,151</td>
<td>$377,284</td>
<td>$9,867</td>
<td>$387,151</td>
<td>$0</td>
</tr>
<tr>
<td>4</td>
<td>$308,006</td>
<td>$0</td>
<td>$60,856</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$394,963</td>
<td>$385,096</td>
<td>$9,867</td>
<td>$394,963</td>
<td>$0</td>
</tr>
<tr>
<td>5</td>
<td>$314,166</td>
<td>$0</td>
<td>$62,682</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$402,948</td>
<td>$393,081</td>
<td>$9,867</td>
<td>$402,948</td>
<td>$0</td>
</tr>
<tr>
<td>6</td>
<td>$320,450</td>
<td>$0</td>
<td>$64,562</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$411,112</td>
<td>$401,245</td>
<td>$9,867</td>
<td>$411,112</td>
<td>$0</td>
</tr>
<tr>
<td>7</td>
<td>$326,878</td>
<td>$0</td>
<td>$66,494</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$419,458</td>
<td>$409,591</td>
<td>$9,867</td>
<td>$419,458</td>
<td>$0</td>
</tr>
<tr>
<td>8</td>
<td>$333,396</td>
<td>$0</td>
<td>$68,494</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$427,990</td>
<td>$418,123</td>
<td>$9,867</td>
<td>$427,990</td>
<td>$0</td>
</tr>
<tr>
<td>9</td>
<td>$340,064</td>
<td>$0</td>
<td>$70,549</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$436,713</td>
<td>$426,846</td>
<td>$9,867</td>
<td>$436,713</td>
<td>$0</td>
</tr>
<tr>
<td>10</td>
<td>$346,865</td>
<td>$0</td>
<td>$72,666</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$445,631</td>
<td>$435,764</td>
<td>$9,867</td>
<td>$445,631</td>
<td>$0</td>
</tr>
<tr>
<td>11</td>
<td>$353,802</td>
<td>$0</td>
<td>$74,846</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$454,748</td>
<td>$444,881</td>
<td>$9,867</td>
<td>$454,748</td>
<td>$0</td>
</tr>
<tr>
<td>12</td>
<td>$360,878</td>
<td>$0</td>
<td>$77,091</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$464,069</td>
<td>$454,202</td>
<td>$9,867</td>
<td>$464,069</td>
<td>$0</td>
</tr>
<tr>
<td>13</td>
<td>$368,096</td>
<td>$0</td>
<td>$79,404</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$473,600</td>
<td>$463,733</td>
<td>$9,867</td>
<td>$473,600</td>
<td>$0</td>
</tr>
<tr>
<td>14</td>
<td>$375,458</td>
<td>$0</td>
<td>$81,768</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$483,344</td>
<td>$473,477</td>
<td>$9,867</td>
<td>$483,344</td>
<td>$0</td>
</tr>
<tr>
<td>15</td>
<td>$382,967</td>
<td>$0</td>
<td>$84,239</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$493,306</td>
<td>$483,439</td>
<td>$9,867</td>
<td>$493,306</td>
<td>$0</td>
</tr>
<tr>
<td>16</td>
<td>$390,626</td>
<td>$0</td>
<td>$86,766</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$503,493</td>
<td>$493,626</td>
<td>$9,867</td>
<td>$503,493</td>
<td>$0</td>
</tr>
<tr>
<td>17</td>
<td>$398,439</td>
<td>$0</td>
<td>$89,369</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$513,908</td>
<td>$513,055</td>
<td>$9,867</td>
<td>$513,908</td>
<td>$0</td>
</tr>
<tr>
<td>18</td>
<td>$406,408</td>
<td>$0</td>
<td>$92,051</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$524,558</td>
<td>$524,684</td>
<td>$9,867</td>
<td>$524,558</td>
<td>$0</td>
</tr>
<tr>
<td>19</td>
<td>$414,536</td>
<td>$0</td>
<td>$94,812</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$535,448</td>
<td>$535,579</td>
<td>$9,867</td>
<td>$535,448</td>
<td>$0</td>
</tr>
<tr>
<td>20</td>
<td>$422,827</td>
<td>$0</td>
<td>$97,666</td>
<td>$304,651</td>
<td>$26,100</td>
<td>$546,833</td>
<td>$547,072</td>
<td>$9,867</td>
<td>$546,833</td>
<td>$0</td>
</tr>
<tr>
<td><strong>AGGREGATE</strong></td>
<td><strong>$7,176,953</strong></td>
<td><strong>$0</strong></td>
<td><strong>$1,496,468</strong></td>
<td><strong>$304,651</strong></td>
<td><strong>$522,000</strong></td>
<td><strong>$9,500,072</strong></td>
<td><strong>$7,221,302</strong></td>
<td><strong>$197,340</strong></td>
<td><strong>$7,418,642</strong></td>
<td><strong>$2,081,430</strong></td>
</tr>
</tbody>
</table>

Energy & Interest Rates as per RFP
Appendix 1: ESCO Financial Information – Include the most recent annual reports, financial statements, or other financial information sufficient to permit the Township to evaluate the financial strength of the ESCO. If the ESCO is a joint venture or other entity with no prior financial history, submit information with respect to constituent or parent entities as appropriate.

As evidence of our financial strength, we have included the requested information listed below immediately following this page for your review:

- Audited Financial Statements for the last three (3) Years
- Banking and Trade References

ESG has the ability to provide Performance and Payment Bonds during the construction phase equal to 100% of the new Energy Conservation Measure (ECM) cost. It is important to note, Performance and Payment Bonds provided by ESG would not extend to or provide any payments or coverage for an energy savings guarantee. If purchased by the township, ESG is capable of providing an energy savings bond should the district require one be placed in association with such guarantee.

Information regarding our bonding company and insurance agent can be found below. Energy Systems Group’s (ESG’s) bonding company is rated A.M. Best Rated A XV and our current available bonding capacity is $500M from Liberty Mutual.

**Bonding Company**
Liberty Mutual Insurance
175 Berkley Street
Boston, MA 02117

**Bonding Agent**
Marsh USA Inc.
Brian Cook, Attorney-in-Fact
125 Ottawa Ave. N.W., Suite #400
Grand Rapids, MI 49503
616.233.4231 – phone
616.233.4398 - fax
Brian.K.Cook@marsh.com

**Insurance Agent**
Willis of Minnesota, Inc.
1600 Utica Avenue South #600
Minneapolis, MN  55416
763.302.7201 – phone
Andrew.Mahoney@willis.com
ENERGY SYSTEMS GROUP, LLC
AND SUBSIDIARIES

Consolidated Financial Report

December 31, 2017, 2016, and 2015
CONTENTS

Independent Auditor’s Report

Page 2

Consolidated Financial Statements:

Consolidated Balance Sheets 4

Consolidated Statements of Operations and Member’s Equity 6

Consolidated Statements of Cash Flows 7

Notes to Consolidated Financial Statements 9
INDEPENDENT AUDITOR'S REPORT

To the Board of Directors
Energy Systems Group, LLC and Subsidiaries

Report on the Financial Statements

We have audited the accompanying consolidated financial statements of Energy Systems Group, LLC and Subsidiaries which comprise the consolidated balance sheets as of December 31, 2017, 2016, and 2015, the related consolidated statements of operations and member’s equity and cash flows for the years then ended, and the related notes to the consolidated financial statements (collectively, the financial statements).

Management’s Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor’s Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor’s judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity’s preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity’s internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

Evansville, IN  Louisville, KY
INDEPENDENT AUDITOR’S REPORT (CONTINUED)

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to on the previous page present fairly, in all material respects, the financial position of Energy Systems Group, LLC and Subsidiaries, as of December 31, 2017, 2016, and 2015, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Harding, Shymanski & Company, P.S.C.

Evansville, Indiana
February 21, 2018
# ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

## CONSOLIDATED BALANCE SHEETS
December 31, 2017, 2016, and 2015

(In thousands)

<table>
<thead>
<tr>
<th>ASSETS</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRENT ASSETS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$49,356</td>
<td>$79,622</td>
<td>$46,639</td>
</tr>
<tr>
<td>Contracts and accounts receivable</td>
<td>19,392</td>
<td>27,607</td>
<td>25,107</td>
</tr>
<tr>
<td>Notes receivable</td>
<td>89</td>
<td>106</td>
<td>85</td>
</tr>
<tr>
<td>Due from affiliate</td>
<td>1,652</td>
<td>603</td>
<td>37</td>
</tr>
<tr>
<td>Costs and estimated earnings in excess of billings on uncompleted contracts</td>
<td>17,843</td>
<td>8,726</td>
<td>15,314</td>
</tr>
<tr>
<td>Pre-contract costs</td>
<td>10,192</td>
<td>6,793</td>
<td>3,879</td>
</tr>
<tr>
<td>Other current assets</td>
<td>7,461</td>
<td>9,325</td>
<td>6,748</td>
</tr>
<tr>
<td><strong>Total current assets</strong></td>
<td><strong>105,985</strong></td>
<td><strong>132,782</strong></td>
<td><strong>97,809</strong></td>
</tr>
<tr>
<td><strong>OTHER ASSETS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in affiliate</td>
<td>-</td>
<td>-</td>
<td>152</td>
</tr>
<tr>
<td>Goodwill</td>
<td>29,740</td>
<td>29,740</td>
<td>29,740</td>
</tr>
<tr>
<td>Other intangible assets, net of accumulated amortization of $2,660, $1,951, and $1,242</td>
<td>10,481</td>
<td>11,190</td>
<td>11,899</td>
</tr>
<tr>
<td></td>
<td>40,221</td>
<td>40,930</td>
<td>41,791</td>
</tr>
<tr>
<td>Property and Equipment, Net</td>
<td>11,235</td>
<td>9,898</td>
<td>20,399</td>
</tr>
<tr>
<td><strong>$ 157,441</strong></td>
<td><strong>$ 183,610</strong></td>
<td><strong>$ 159,999</strong></td>
<td></td>
</tr>
</tbody>
</table>

See notes to consolidated financial statements.
LIABILITIES AND MEMBER'S EQUITY

Current Liabilities
Accounts payable, including retainage of $10,675, $8,655, and $4,764 $ 38,140 $ 24,317 $ 23,311
Billings in excess of costs and estimated earnings on uncompleted contracts 36,195 37,622 29,234
Accrued expenses and taxes 14,545 13,161 10,399

Total current liabilities 88,880 75,100 62,944

Long-Term Notes Payable to Affiliate 45,000 45,000

Other Liabilities 2,627 2,857 2,379

Total liabilities 91,507 122,957 110,323

Member's Equity 65,934 60,653 49,676

$ 157,441 $ 183,610 $ 159,999

See notes to consolidated financial statements.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS AND MEMBER'S EQUITY
Years Ended December 31, 2017, 2016, and 2015

(In thousands)  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$281,820</td>
<td>$260,000</td>
<td>$199,903</td>
</tr>
<tr>
<td>Cost of Revenues</td>
<td>214,385</td>
<td>196,872</td>
<td>155,775</td>
</tr>
<tr>
<td><strong>Gross profit</strong></td>
<td>67,435</td>
<td>63,128</td>
<td>44,128</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>52,445</td>
<td>50,666</td>
<td>41,866</td>
</tr>
<tr>
<td><strong>Operating income</strong></td>
<td>14,990</td>
<td>12,462</td>
<td>2,262</td>
</tr>
<tr>
<td>Other Income (Expenses)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest, net</td>
<td>256</td>
<td>(1,711)</td>
<td>(571)</td>
</tr>
<tr>
<td>Other, net</td>
<td>35</td>
<td>118</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total Other Income</strong></td>
<td>291</td>
<td>(1,593)</td>
<td>(555)</td>
</tr>
<tr>
<td>Equity in Earnings of Unconsolidated Affiliate</td>
<td>-</td>
<td>108</td>
<td>262</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>15,281</td>
<td>10,977</td>
<td>1,969</td>
</tr>
<tr>
<td>Member's equity at beginning of year</td>
<td>60,653</td>
<td>49,676</td>
<td>47,707</td>
</tr>
<tr>
<td>Member dividend</td>
<td>(10,000)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Member's equity at end of year</td>
<td>$65,934</td>
<td>$60,653</td>
<td>$49,676</td>
</tr>
</tbody>
</table>

See notes to consolidated financial statements.
<table>
<thead>
<tr>
<th>Description</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash Flows from Operating Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net income</td>
<td>$15,281</td>
<td>$10,977</td>
<td>$1,969</td>
</tr>
<tr>
<td>Adjustments to reconcile net income to net cash provided by operating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,128</td>
<td>1,714</td>
<td>1,913</td>
</tr>
<tr>
<td>Amortization</td>
<td>709</td>
<td>709</td>
<td>710</td>
</tr>
<tr>
<td>(Gain) loss on sale of property and equipment</td>
<td>(20)</td>
<td>(212)</td>
<td>20</td>
</tr>
<tr>
<td>Impairment loss</td>
<td>766</td>
<td>2,174</td>
<td>-</td>
</tr>
<tr>
<td>Equity in earnings of unconsolidated affiliate</td>
<td></td>
<td>(108)</td>
<td>(262)</td>
</tr>
<tr>
<td>Unconsolidated affiliate dividends</td>
<td></td>
<td>260</td>
<td>1,250</td>
</tr>
<tr>
<td>Changes in assets and liabilities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease (increase)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracts and accounts receivable</td>
<td>8,215</td>
<td>(2,500)</td>
<td>(7,490)</td>
</tr>
<tr>
<td>Costs and estimated earnings in excess of billings on uncompleted contracts</td>
<td>(9,117)</td>
<td>6,588</td>
<td>(7,365)</td>
</tr>
<tr>
<td>Pre-contract costs</td>
<td>(3,399)</td>
<td>(2,914)</td>
<td>1,024</td>
</tr>
<tr>
<td>Other current assets</td>
<td>1,864</td>
<td>(1,477)</td>
<td>(2,746)</td>
</tr>
<tr>
<td>Increase (decrease)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>13,823</td>
<td>1,006</td>
<td>5,375</td>
</tr>
<tr>
<td>Billings in excess of costs and estimated earnings on uncompleted contracts</td>
<td>(1,427)</td>
<td>8,388</td>
<td>19,366</td>
</tr>
<tr>
<td>Accrued expenses and taxes</td>
<td>1,384</td>
<td>1,662</td>
<td>2,197</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>(230)</td>
<td>478</td>
<td>444</td>
</tr>
<tr>
<td><strong>Net cash provided by operating activities</strong></td>
<td>28,977</td>
<td>26,745</td>
<td>16,405</td>
</tr>
</tbody>
</table>

See notes to consolidated financial statements.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS (CONTINUED)
Years Ended December 31, 2017, 2016, and 2015

(In thousands)  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flows from Investing Activities</td>
<td>2017</td>
<td>2016</td>
<td>2015</td>
</tr>
<tr>
<td>Proceeds from sales and pending sales of property and equipment</td>
<td>$ 37</td>
<td>$ 8,585</td>
<td>$ 12</td>
</tr>
<tr>
<td>Purchases of property and equipment</td>
<td>(3,248)</td>
<td>(1,760)</td>
<td>(514)</td>
</tr>
<tr>
<td>Payments (collections) on note receivable</td>
<td>17</td>
<td>(21)</td>
<td>(10)</td>
</tr>
<tr>
<td>Net advances to affiliate</td>
<td>(1,049)</td>
<td>(566)</td>
<td>(15,329)</td>
</tr>
<tr>
<td><strong>Net cash provided by (used in) investing activities</strong></td>
<td>(4,243)</td>
<td>6,238</td>
<td>(15,841)</td>
</tr>
</tbody>
</table>

Cash Flows from Financing Activities  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds from (principal payments on) affiliate long-term borrowings</td>
<td>(45,000)</td>
<td>-</td>
<td>45,000</td>
</tr>
<tr>
<td>Member dividend</td>
<td>(10,000)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net cash provided by (used in) financing activities</strong></td>
<td>(55,000)</td>
<td>-</td>
<td>45,000</td>
</tr>
</tbody>
</table>

Net increase (decrease) in cash and cash equivalents  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30,266)</td>
<td>32,983</td>
<td>45,564</td>
<td></td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at beginning of year</strong></td>
<td>79,622</td>
<td>46,639</td>
<td>1,075</td>
</tr>
<tr>
<td><strong>Cash and cash equivalents at end of year</strong></td>
<td>$ 49,356</td>
<td>$ 79,622</td>
<td>$ 46,639</td>
</tr>
</tbody>
</table>

Supplemental Disclosure of Cash Flow Information  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash payments for:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>$ 885</td>
<td>$ 1,711</td>
<td>$ 582</td>
</tr>
</tbody>
</table>

Supplemental Schedule of Noncash Investing and Financing Activities  

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property and equipment transferred to other current assets in accordance with the deposit method</td>
<td>$ -</td>
<td>$ 1,100</td>
<td>$ -</td>
</tr>
</tbody>
</table>

See notes to consolidated financial statements.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies

Nature of Business

Energy Systems Group, LLC and Subsidiaries (Company), an Indiana limited liability corporation, is a comprehensive energy services and performance contracting company providing energy, facility, and financial solutions to commercial, industrial, governmental, and institutional customers. In addition, the Company builds, owns, and operates certain renewable energy producing assets. Revenues related to construction and other energy related services accounted for the following percentages of the Company’s total revenues for the respective years ended:

<table>
<thead>
<tr>
<th></th>
<th>Construction</th>
<th>Other Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 31, 2017</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>December 31, 2016</td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>December 31, 2015</td>
<td>85%</td>
<td>15%</td>
</tr>
</tbody>
</table>

The Company’s operations are based throughout the contiguous United States, primarily in the Midwest, Mid-Atlantic, and Southern regions.

Principles of Consolidation

The consolidated financial statements include the accounts of the Company and its subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation.

Concentration of Credit Risk

Financial instruments, which potentially subject the Company to concentrations of credit risk, consist principally of cash and cash equivalents, contracts and accounts receivable. At times, such cash and cash equivalents in banks may be in excess of the Federal Deposit Insurance Corporation insurance limit.

Cash and Cash Equivalents

For purposes of reporting the consolidated statements of cash flows, the Company considers all cash accounts, which are not subject to withdrawal restrictions or penalties, and all highly liquid debt instruments purchased with a maturity of three months or less to be cash equivalents. The amounts invested with the member’s Parent classified as cash and cash equivalents at December 31, 2017, 2016, and 2015 were $49,357, $79,339, and $44,870, respectively.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies (Continued)

Revenue and Cost Recognition

Income from construction contracts is recognized by the percentage-of-completion method. The percentage-of-completion is determined by relating the actual cost of work performed to date to the current estimated total cost of the respective contracts. The length of the Company’s contracts varies.

Contract costs include all direct material and labor costs and those indirect costs related to contract performance, such as indirect labor, supplies, tools, repairs, and depreciation.

Provisions for estimated losses on uncompleted contracts are made in the period in which such losses are determined. Changes in job performance, job conditions, and estimated profitability, including those arising from contract penalty provisions and final contract settlements, may result in revisions to costs and income and are recognized in the period in which the revisions are determined. Profit incentives are included in revenue when their realization is reasonably assured.

The asset, “costs and estimated earnings in excess of billings on uncompleted contracts,” represents revenue recognized in excess of amounts billed. The liability, “billings in excess of costs and estimated earnings on uncompleted contracts,” represents billings in excess of revenue recognized.

Pre-contract costs incurred for a specific anticipated contract are capitalized and included in the project cost estimate. Upon award of the contract, revenue is recognized on these costs by the percentage-of-completion method. Pre-contract costs are expensed when it is determined that the award of the contract is doubtful.

Revenues from operations and maintenance contracts and measurement and verification contracts are recognized under the straight-line method over the performance period of the contract.

Revenues from commodity sales are recognized when earned, upon delivery of the commodity to the customer.

Contracts and Accounts Receivable

Contracts and accounts receivable are customer obligations due under normal trade terms. The Company attempts to minimize contracts receivable credit risk by reviewing customer credit history before extending credit and by monitoring customers’ credit exposure on a continuing basis. The direct charge-off method is used to account for losses in collection of contracts and accounts receivable, when applicable. Bad debt expense consists of accounts written-off, net of recoveries. An allowance for uncollectible contracts and accounts receivable is considered unnecessary by management.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies (Continued)

Property, Equipment, and Depreciation

Property and equipment are stated at cost. Provisions for depreciation of property and equipment have been computed on the straight-line method over the estimated useful life.

Amortization of leasehold improvement assets is computed on the straight-line method over the shorter of the useful life of the asset or the life of the lease.

Long-Lived Assets

Long-lived assets are reviewed for impairment in accordance with guidance issued by the Financial Accounting Standards Board (FASB). The Company records impairment losses on long-lived assets when events and circumstances indicate that the assets might be impaired and the undiscounted cash flows estimated to be generated by those assets are less than the carrying amounts of those assets. Impairment losses are measured by comparing the estimated fair value of the assets to their carrying amount.

During the year ended December 31, 2017, the Company determined that certain assets’ carrying value exceeded their net realizable value and thus were written down to zero. Impairment losses for the year ended December 31, 2017 were $766.

On December 15, 2016, the Company entered into an agreement to sell its membership interest in ESG Biofuels (JC). The purchase price was $3,100, which included $1,100 in cash with $2,000 contingent upon ESG Biofuels (JC)’s application with the Environmental Protection Agency to become a Renewable Identification Numbers generator being accepted. In accordance with ASC 360-20, the Company accounted for the sale of the membership interest and its underlying real estate assets using the deposit method. The $1,100 in cash was received by December 31, 2016, and was included as a deposit liability in accrued expenses and taxes. All rights and title of the membership interest and its underlying real estate assets transferred to the buyer at December 15, 2016. At December 31, 2016, subject to collectability assessment, the contingent payment of $2,000 was fully reserved. During 2017, the Renewable Identification Number application with the Environmental Protection Agency was not accepted. As of December 31, 2017, the timeframe for the contingent payment has expired and the Company has removed the contingent payment and deposit liability, as well as the related reserve from its balance sheet.

There were no impairment losses for the year ended December 31, 2015.

Goodwill and Other Intangible Assets

Goodwill and other intangible assets having an indefinite life are tested for impairment, at least annually, using a fair value based approach. Intangible assets with finite lives are being amortized on the straight-line method over their estimated useful life.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015
(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies (Continued)

Investment in Affiliate and Construction Joint Venture

During 2012, the Company entered into a partnership agreement to form a construction joint venture. The
equity method of accounting was used for the joint venture. Under the equity method of accounting, the
Company’s share of the net income of the affiliate was recognized as income in the Company’s income
statement and added to the investment account. Also, capital contributions made to the affiliate were treated as
an increase to the investment account and dividends received from the affiliate were treated as a reduction in the
investment account.

The Company owned 50 percent of the affiliate. During 2016, the construction joint venture dissolved upon
project completion. Condensed financial information of the affiliate as of and for the years ended December 31,
2016 and 2015 is as follows:

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td>$ -</td>
<td>$ 1,755</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>$ -</td>
<td>$ 1,451</td>
</tr>
<tr>
<td>Energy Systems Group, LLC interest</td>
<td>$ -</td>
<td>$ 152</td>
</tr>
<tr>
<td>Non-Energy Systems Group, LLC interest</td>
<td>-</td>
<td>152</td>
</tr>
<tr>
<td>Total member’s equity</td>
<td>$ -</td>
<td>$ 304</td>
</tr>
<tr>
<td>Sales</td>
<td>$ 542</td>
<td>$ 9,296</td>
</tr>
<tr>
<td>Energy Systems Group, LLC equity in net income</td>
<td>$ 108</td>
<td>$ 262</td>
</tr>
<tr>
<td>Non-Energy Systems Group, LLC equity in net income</td>
<td>108</td>
<td>262</td>
</tr>
<tr>
<td>Total net income</td>
<td>$ 216</td>
<td>$ 524</td>
</tr>
</tbody>
</table>

Subsequent Events Evaluation

Since the Company is a subsidiary of a public entity, management has evaluated subsequent events through
February 21, 2018, which represents the date the member’s Parent’s consolidated financial statements were
issued.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies (Continued)

Use of Estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America (U.S. GAAP) requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

Recent Accounting Pronouncements

Leases

In February 2016, the FASB issued new accounting guidance for the recognition, measurement, presentation and disclosure of leasing arrangements. This ASU requires the recognition of lease assets and liabilities for those leases currently classified as operating leases while also refining the definition of a lease. In addition, lessees will be required to disclose key information about the amount, timing, and uncertainty of cash flows arising from leasing arrangements. This ASU is effective for the interim and annual reporting periods beginning January 1, 2019, although it can be early adopted, with a modified retrospective approach for leases that commenced prior to the date of adoption. The Company is currently evaluating the standard to determine the impact it will have on the financial statements and will adopt the guidance effective January 1, 2019.

Revenue Recognition from Contracts with Customers

In May 2014, the FASB issued new accounting guidance to clarify the principles for recognizing revenue and to develop a common revenue standard for U. S. GAAP. The amendments in this guidance state an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. This new guidance requires improved disclosures to help users of financial statements better understand the nature, amount, timing, and uncertainty of revenue that is recognized. The guidance can be applied retrospectively to each prior reporting period presented (full retrospective method) or retrospectively with a cumulative effect adjustment to retained earnings for initial application of the guidance at the date of initial adoption (modified retrospective method). The Company plans to adopt the guidance under the modified retrospective method. The cumulative effect adjustment to retained earnings is expected to be $1,300.

In July 2015, the FASB approved a one year deferral that became effective through an ASU in August and changed the effective date to annual reporting periods beginning after December 15, 2017, including interim periods, with early adoption permitted, but not before the original effective date of December 15, 2016.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 1 – Nature of Business and Significant Accounting Policies (Continued)

Recent Accounting Pronouncements (Continued)

Revenue Recognition from Contracts with Customers (Continued)

The Company has finalized the assessment process of all revenue streams for the standard’s impact on the Consolidated Balance Sheets, Consolidated Statements of Operations, and disclosures and has identified all material revenue streams. The Company has determined that all material revenue streams fall under the scope of the standard. The standard has resulted in no significant changes to the Company's pattern of revenue recognition. Updates to processes and controls have been implemented related to uninstalled materials. The Company has adopted the guidance effective January 1, 2018.

Note 2 – Contracts and Accounts Receivable

Contracts and accounts receivable are expected to be collected within one year from the consolidated balance sheet dates.

Contracts and accounts receivable at December 31, 2017, 2016, and 2015 consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracts and accounts</td>
<td>$ 1,798</td>
<td>$ 8,733</td>
<td>$ 553</td>
</tr>
<tr>
<td>accounts receivable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed contracts</td>
<td>11,399</td>
<td>14,223</td>
<td>20,589</td>
</tr>
<tr>
<td>Contracts-in-process</td>
<td>6,195</td>
<td>4,651</td>
<td>3,965</td>
</tr>
<tr>
<td>Retainages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$19,392</td>
<td>$27,607</td>
<td>$25,107</td>
</tr>
</tbody>
</table>
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 3 – Costs and Estimated Earnings on Uncompleted Contracts

Costs and estimated earnings on uncompleted contracts at December 31, 2017, 2016, and 2015 consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs incurred on uncompleted contracts</td>
<td>$291,519</td>
<td>$258,736</td>
<td>$145,654</td>
</tr>
<tr>
<td>Estimated earnings</td>
<td>68,235</td>
<td>66,905</td>
<td>37,160</td>
</tr>
<tr>
<td></td>
<td>359,754</td>
<td>325,641</td>
<td>182,814</td>
</tr>
<tr>
<td>Less billings to date</td>
<td>(378,106)</td>
<td>(354,537)</td>
<td>(196,734)</td>
</tr>
<tr>
<td></td>
<td>$(18,352)</td>
<td>$(28,896)</td>
<td>$(13,920)</td>
</tr>
</tbody>
</table>

Included in the accompanying consolidated balance sheets under the following captions:

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs and estimated earnings in excess of billings on uncompleted contracts</td>
<td>$17,843</td>
<td>$8,726</td>
<td>$15,314</td>
</tr>
<tr>
<td>Billings in excess of costs and estimated earnings on uncompleted contracts</td>
<td>(36,195)</td>
<td>(37,622)</td>
<td>(29,234)</td>
</tr>
<tr>
<td></td>
<td>$(18,352)</td>
<td>$(28,896)</td>
<td>$(13,920)</td>
</tr>
</tbody>
</table>
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 4 – Intangible Assets

Intangible assets at December 31, 2017, 2016, and 2015 consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible assets, subject to amortization:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer relationships</td>
<td>$ 7,096</td>
<td>$ 7,096</td>
<td>$ 7,096</td>
</tr>
<tr>
<td>Intangible assets, not subject to amortization:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESPC licenses</td>
<td>6,045</td>
<td>6,045</td>
<td>6,045</td>
</tr>
<tr>
<td>Goodwill</td>
<td>29,740</td>
<td>29,740</td>
<td>29,740</td>
</tr>
<tr>
<td></td>
<td>42,881</td>
<td>42,881</td>
<td>42,881</td>
</tr>
<tr>
<td>Accumulated amortization</td>
<td>(2,660)</td>
<td>(1,951)</td>
<td>(1,242)</td>
</tr>
</tbody>
</table>

$ 40,221 $ 40,930 $ 41,639

Amortization expense for the three years ended December 31, 2017, 2016, and 2015 was $709, $709, and $710, respectively. The estimated amortization expense expected to be charged to income over each of the next five years is $709.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 5 – Property and Equipment

Property and equipment at December 31, 2017, 2016, and 2015 consisted of the following:

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$4,814</td>
<td>$5,331</td>
<td>$4,955</td>
</tr>
<tr>
<td>Leasehold improvements</td>
<td>12,284</td>
<td>13,977</td>
<td>27,678</td>
</tr>
<tr>
<td>Construction-in-progress</td>
<td>2,499</td>
<td>455</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>19,597</td>
<td>19,763</td>
<td>32,687</td>
</tr>
</tbody>
</table>

Accumulated depreciation

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8,362)</td>
<td>(9,865)</td>
<td>(12,288)</td>
<td></td>
</tr>
</tbody>
</table>

$11,235          $9,898          $20,399

Depreciation expense for the three years ended December 31, 2017, 2016, and 2015 was $1,128, $1,714, and $1,913, respectively.

Note 6 – Commitments and Contingencies

At December 31, 2017, 2016, and 2015, the Company had outstanding surety bonds of approximately $755,000, $688,000, and $528,000, respectively, for its performance, payment, and energy savings guarantees. The Company’s member’s Parent has entered into an agreement to guarantee up to $25,000 for the payment of amounts due for these surety bonds, should the Company default on its obligations to complete construction, pay vendors and subcontractors, or achieve energy savings guarantees. Upon final acceptance, payment and performance bonds are replaced with maintenance bonds at ten percent of the original face value and remain in effect during the one-year warranty period. Energy savings guarantee bonds are for various lengths and are reduced annually based upon the amount of guarantee met. In addition, the Company’s member’s Parent has outstanding performance guarantees for certain projects related to construction, energy services, and operations. If events arise that indicate required performance under the guarantees, the Company would record a liability.

Generally, guaranteed savings, whereby the Company guarantees that the customer will achieve certain levels of energy savings over a specified number of years and warranty agreements accompany the contracts. The Company has determined based on historical results that an energy guarantee reserve is unnecessary.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 7 – Litigation

The Company is involved in lawsuits, claims, investigations, and proceedings, which arise in the ordinary course of business. If management believes that a loss arising from these matters is probable and can be reasonably estimated, a loss is recorded. As additional information becomes available, these matters are assessed and the estimates are revised, if necessary. Based on currently available information, management believes that the ultimate outcome of these matters, individually and in the aggregate, will not have a material adverse effect on the Company’s business, financial condition, or results of operation.

Note 8 – Fair Value of Financial Instruments

Certain assets and liabilities are recorded at fair value.

FASB Accounting Standards Codification (ASC) 820, Fair Value Measurements and Disclosures, provides the framework for measuring fair value. That framework provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements).

The asset’s or liability’s fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs.

For the years ended December 31, 2017, 2016, and 2015, the application of valuation techniques applied to similar assets and liabilities has been consistent. The following is a description of the valuation methodology used for instruments measured at fair value:

Cash, cash equivalents, receivables, accounts payable, accrued expenses, and payables – Carrying amount approximates fair value because of the short maturity of those instruments.

Fair Value on a Nonrecurring Basis

Certain assets and liabilities are measured at fair value on a nonrecurring basis; that is, the instruments are not measured at fair value on an ongoing basis but are subject to fair value adjustments in certain circumstances (for example, when there is evidence of impairment).

In accordance with FASB guidance related to impairments of long-lived assets, a long-lived asset with a carrying amount of $766 was fully impaired using Level 2 measurements, resulting in an impairment charge of $766, which was included in operating expenses for the year ended December 31, 2017.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 8 – Fair Value of Financial Instruments (Continued)

Fair Value on a Nonrecurring Basis (Continued)

During 2016, a long-lived asset with a carrying amount of $3,274, was partially impaired. The impairment was based on the final expected sales price of $1,100, resulting in an impairment charge of $2,174, which was included in operating expenses for the year ended December 31, 2016. The asset was included in other current assets as of December 31, 2016.

Note 9 – Parent Financial Services and Security Agreement

The Company and its member’s Parent have entered into a financial services and security agreement whereby the Parent provides cash management services to the Company in the form of short and long-term loans and investment of excess cash balances.

The Company has a short-term borrowing credit facility with its member’s Parent with a borrowing limit of $35,000. Interest on short-term notes payable are based on the rate per annum equal to the lender’s weighted average daily cost of funds, 1.89 percent at December 31, 2017. There were no outstanding borrowings at December 31, 2017, 2016, and 2015. The Company’s advances to the member’s Parent at December 31, 2017, 2016, and 2015 were $49,357, $79,339, and $44,870, respectively, and meet the criteria for a cash equivalent and have been included as such in the consolidated balance sheets.

The Company also has a long-term borrowing credit facility with its member’s Parent with a borrowing limit of $45,000. Interest on long-term notes payable is based on the rate per annum equal to the lender’s weighted average rate of its bonds, 4.35 percent at December 31, 2017, and due monthly. At December 31, 2016 and 2015, the Company had outstanding long-term borrowings of $45,000. There were no outstanding long-term borrowings under this credit facility at December 31, 2017.

Note 10 – Income Taxes

The limited liability companies (LLCs) are not tax-paying entities for income tax purposes. Income from the LLCs is taxed to its member (Vectren Corporation) on its corporate return; therefore, there is no tax provision provided on income for the LLCs.

Management evaluated the Company’s uncertain tax positions and concluded that the Company had taken no uncertain tax positions that require adjustment to the consolidated financial statements.

-19-
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 11 – Employee Incentive Plans

The Company has a defined contribution plan with a profit-sharing component for all employees. Discretionary profit-sharing contributions to the plan are made when certain conditions are met. Additionally, employees are auto enrolled in the defined contribution plan at five percent, unless they affirmatively elect not to participate, a portion of which is matched by the Company. The Company’s contribution for the three years ended December 31, 2017, 2016, and 2015 was $3,684, $3,299, and $2,951, respectively.

Note 12 – Related Party Transactions

At December 31, 2017, 2016, and 2015, the Company had a short-term net receivable due from its member's Parent of $1,652, $603, and $37, respectively.

At December 31, 2017, there were no long-term note payable amounts outstanding. At December 31, 2016 and 2015, the Company had long-term notes payable to affiliate of $45,000.

For the years ended December 31, 2017, 2016, and 2015, the Company had net related party interest income (expense) of $225, ($1,715), and ($585), respectively.

The member’s Parent provides certain services for which the Company is not charged.
ENERGY SYSTEMS GROUP, LLC AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
December 31, 2017, 2016, and 2015

(In thousands)

Note 13 – Leases

The Company leases certain property and equipment under noncancelable operating lease agreements expiring on various dates through 2027. At December 31, 2017, aggregate future minimum rental payments required under the noncancelable operating leases are as follows:

<table>
<thead>
<tr>
<th>Years Ending December 31,</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$ 1,375</td>
</tr>
<tr>
<td>2019</td>
<td>1,124</td>
</tr>
<tr>
<td>2020</td>
<td>916</td>
</tr>
<tr>
<td>2021</td>
<td>731</td>
</tr>
<tr>
<td>2022</td>
<td>690</td>
</tr>
<tr>
<td>Thereafter</td>
<td>3,046</td>
</tr>
</tbody>
</table>

Total rental expense under all operating leases for the three years ended December 31, 2017, 2016, and 2015 was $1,679, $1,485, and $1,553, respectively.

Note 14 – Major Customers and Large Contracts and Accounts Receivable

Major customers and large contracts and accounts receivable are those greater than ten percent of the respective total.

During the year ended December 31, 2017, the Company had two major customers from which revenues totaled $72,960. During the years ended December 31, 2016 and 2015, the Company had one major customer from which revenues totaled $28,675 and $23,800, respectively.

At December 31, 2017 and 2016, large contracts receivable balances from two customers totaled $5,890 and $12,025, respectively. At December 31, 2015, large contracts receivable balances from one customer totaled $4,181.
Banking Reference:
Fifth/Third
PO Box 778
Evansville, IN
47705-0778
Contact: Jennifer Raibley
Phone: (812) 456-3812
General Acct: 101480880

Trade References:

Adena Utilities Engineering, Inc.
3700 Park 42 Drive, Suite 155 B
Cincinnati, Ohio 45241
Phone: (513) 563-4911
Fax: (513) 563-5017

Advanced Power Technologies, Inc.
433 North 36th Street
Lafayette, Indiana 47905
Phone: (765) 446-2343
Fax: (661) 825-8895

Columbia Pipe & Supply, Co.
23671 Network Place
Chicago, IL 60673-1236
Phone: (888) 361-4700
Fax: (773) 927-8415

Constellation Energy Services
10 South Dearborn St., 51st Floor
Chicago, IL 60603
Phone: (877) 409-9836

Delta Connects, Inc.
12 Stults Road, Suite 135
Dayton, NJ 08810
Phone: (609) 860-6600

Eaton Corporation
1000 Cherrington Parkway
Moon Township, PA 15108
Phone: (412) 893-3300

Harding Shymanski & Co., PC
PO Box 3677
Evansville, IN 47735-3677
Phone: (812) 464-9161
Fax: (858) 694-6891

Hitec Power Protection, Inc.
25707 Southwest Freeway
Rosenberg, TX 77471
Phone: (281) 239-0178
Fax: (661) 825-8895

Integrated Technologies 2216
Highland Springs Place
Louisville, KY 40245
Phone: (502) 253-2825
Fax: (502) 253-1087

McMaster-Carr
PO Box 7690
Chicago, IL 60680-7690
Phone: (630) 600-3600
Fax: (630) 834-9427

Office Depot
PO Box 30292
Salt Lake City UT 84130-0292
Phone: (800) 729-7744
Fax: (801) 779-7425

Solar Turbines Inc.
PO Box 85376
San Diego, CA 92186-5376
Phone: (630) 527-1700
Fax: (858) 694-6891

The Trane Company
Attn: Chris Dayton
3600 Pammel Creek Road
LaCrosse, WI 54601
Phone: (608) 787-4346
Fax: (608) 787-2409

Universal Supply Group, Inc.
275 Wagaraw Road
Hawthorne, NJ 07506
Phone: (973) 427-3320

WW Grainger Inc.
Dept 272- Acct #39447653
Palatine IL 60038-0001
Phone: (847) 793-5200
Fax: (847) 647-2060

Adena Utilities Engineering, Inc.
3700 Park 42 Drive, Suite 155 B
Cincinnati, Ohio 45241
Phone: (513) 563-4911
Fax: (513) 563-5017

Advanced Power Technologies, Inc.
433 North 36th Street
Lafayette, Indiana 47905
Phone: (765) 446-2343
Fax: (661) 825-8895

Columbia Pipe & Supply, Co.
23671 Network Place
Chicago, IL 60673-1236
Phone: (888) 361-4700
Fax: (773) 927-8415

Constellation Energy Services
10 South Dearborn St., 51st Floor
Chicago, IL 60603
Phone: (877) 409-9836

Delta Connects, Inc.
12 Stults Road, Suite 135
Dayton, NJ 08810
Phone: (609) 860-6600

Eaton Corporation
1000 Cherrington Parkway
Moon Township, PA 15108
Phone: (412) 893-3300

Harding Shymanski & Co., PC
PO Box 3677
Evansville, IN 47735-3677
Phone: (812) 464-9161
Fax: (858) 694-6891

Hitec Power Protection, Inc.
25707 Southwest Freeway
Rosenberg, TX 77471
Phone: (281) 239-0178
Fax: (661) 825-8895

Integrated Technologies 2216
Highland Springs Place
Louisville, KY 40245
Phone: (502) 253-2825
Fax: (502) 253-1087

McMaster-Carr
PO Box 7690
Chicago, IL 60680-7690
Phone: (630) 600-3600
Fax: (630) 834-9427

Office Depot
PO Box 30292
Salt Lake City UT 84130-0292
Phone: (800) 729-7744
Fax: (801) 779-7425

Solar Turbines Inc.
PO Box 85376
San Diego, CA 92186-5376
Phone: (630) 527-1700
Fax: (858) 694-6891

The Trane Company
Attn: Chris Dayton
3600 Pammel Creek Road
LaCrosse, WI 54601
Phone: (608) 787-4346
Fax: (608) 787-2409

Universal Supply Group, Inc.
275 Wagaraw Road
Hawthorne, NJ 07506
Phone: (973) 427-3320

WW Grainger Inc.
Dept 272- Acct #39447653
Palatine IL 60038-0001
Phone: (847) 793-5200
Fax: (847) 647-2060
Appendix 2: Sample Contract – ESCO shall provide a sample contract, including all appropriate attachments and exhibits.

A Sample Contract has been included immediately following this page.
GUARANTEED ENERGY SAVINGS
PERFORMANCE CONTRACT

THIS AGREEMENT (herein sometimes “Agreement” and sometimes “Contract”), made this ___
day of ________________, 20__, by and between Lower Merion Township, Springfield, Pennsylvania, a
________________ (hereinafter called “Township” or “Owner”) and Energy Systems Group, LLC, an Indiana
limited liability company (hereinafter called “Contractor” or “ESG”),

WITNESSETH, That:

WHEREAS, On or about October 4, 2018, TOWNSHIP publically solicited competitive sealed
proposals for energy conservation measures through a Guaranteed Energy Savings Contract pursuant to the
requirements of Act 57 of 1998, 62 Pa. C.S. §3751-3757, as amended under Act 77 of 2004 and Act 39 of
2010 (the “Request”);

WHEREAS, Contractor submitted to Owner a proposal in response to the Request for the
construction and/or installation of energy related upgrades at facilities owned by Owner and located in
Montgomery County, Pennsylvania (herein the “Facilities”); and

WHEREAS, Owner wishes to accept Contractor’s proposal to perform the work and services
described in Exhibit A Scope of Work (hereinafter the “Project”), and Owner and Contractor desire to enter
into this Agreement to memorialize their respective agreements and undertakings with respect to the Project.

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

1. Contract Documents. The parties hereby incorporate by reference, as if fully set forth
herein, the following documents and instruments, all of which together with this Agreement are herein referred
to as the “Contract Documents”:

Exhibit A - Scope of Work
Exhibit B - Energy Savings Guarantee and Measurement and Verification Plan
Exhibit C - Support Services Agreement
Exhibit D - Opinion of Owner’s Counsel
Exhibit E - State Specific Statutory Requirements
Exhibit F - Prevailing Wage Determination
The Contract Documents also shall include any permissible change orders issued pursuant to this Agreement.

If there is a conflict between the provisions of this Agreement and any other Contract Document, the provisions of this Agreement shall control with respect to the subject matter hereof.

2. Scope of Project. For purposes hereof, the term “Project” shall mean and include the installation of the energy conservation measures and related upgrades ("ECMs" or "Measures") at Owner's Facilities, which are defined in Exhibit A, Scope of Work, and annual support services as outlined in Exhibit C, Support Services Agreement.

2.1 Dodd-Frank Municipal Advisor Rule Statement: ESG is retained by Owner as an engineering and energy services firm to design and deliver energy-related and other infrastructure solutions described in the Scope of Work. Owner acknowledges that ESG is not a financial advisor or municipal advisor as contemplated under the U.S. securities laws, is not providing recommendations regarding any municipal financial product or the issuance of municipal securities, and does not owe a fiduciary duty to Owner under section 15B of the Securities Exchange Act, or otherwise. Owner acknowledges that as a commercial entity ESG is influenced by its own interests, which will not always be the same as Owner’s. Owner has had the opportunity to retain and consult with such financial, municipal, legal or other advisors as it may deem appropriate regarding this project.

3. General Obligations and Rights of Contractor. Contractor shall do all acts and provide all things necessary to perform and complete the Project properly, in a good and workmanlike manner, and in compliance with all laws and regulations. Contractor shall apply for, secure, and obtain all necessary permits and licenses which may be required in connection with the Project.

3.1 Warranty. Contractor hereby warrants to Owner that all materials furnished by Contractor, if any, and all workmanship performed by Contractor in connection with the Project, shall be in accordance with the general industry standards of the construction industry; shall be performed in a competent, good and workmanlike manner and in compliance with the Contract Documents, and all pertinent laws, rules and regulations; and shall be free from any and all faults or defects in material and workmanship. Contractor shall promptly remedy any and all defective materials or workmanship
furnished by Contractor or any subcontractor upon receipt of written notice thereof from Owner. If required by Owner, Contractor shall furnish satisfactory evidence as to kind and quality of materials and equipment used in connection with the Project.

The warranty set forth herein shall continue to be effective for a period of one year following Owner's acceptance or beneficial use of each ECM, acceptance of a particular Facility, or acceptance of the Project, whichever comes first. Owner shall give Contractor written notice of all defective work, specifically detailing the deficiencies to be corrected, and Contractor shall repair or otherwise remedy such defective work in an expeditious manner.

CONTRACTOR MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. To the extent possible, Contractor shall assign to Owner all warranties that Contractor receives from its vendors and/or subcontractors for any materials or equipment, which are or are to become permanent features of the Project, which shall be in addition to the other warranties provided herein.

3.2 Approvals. Upon completion of the Project, Contractor shall obtain all approvals of the installation of the Measures constituting the Project.

3.3 Indemnification. Contractor shall indemnify, defend, and hold harmless Owner, the agents, officers, employees, and representatives of Owner (herein the “Indemnified Owner Parties”) against all liability and loss including reasonable attorney’s fees and expenses to the extent resulting from the negligence or willful misconduct in connection with the Project by Contractor, any subcontractor, or the agents, employees, or representatives of Contractor or any subcontractor, including any injury (including death) sustained by or any damage to the property of, any person; provided however, that Contractor shall not be responsible for any injury (including death), damage, or loss (including reasonable attorneys fees and expenses) that is caused by the sole negligence of an Indemnified Owner Party, nor shall Contractor be held responsible for the concurrent negligence of an Indemnified Owner Party.

Contractor agrees to indemnify, save and hold Owner, its successors and assigns, and any assignee of Contractor, harmless from the payment of any sum of money whatsoever (including reasonable attorneys fees and expenses) on account of any laborer’s, mechanic’s, materialmen's or
any other lien against Owner’s property related to Contractor’s performance of the Project, unless the lien is caused by some fault of Owner or some person or entity acting on Owner’s behalf.

Owner shall indemnify, defend and hold harmless Contractor, and the agents, officers, shareholders, directors, and employees of Contractor and any assignee of Contractor (herein the “Indemnified Contractor Parties”) against all liability and loss including reasonable attorney's fees and expenses to the extent resulting from the negligence or willful misconduct in connection with the Project by Owner and agents, employees or representatives of Owner, including any injury (including death) sustained by or any damage to the property of, any person; provided, however, that Owner shall not be responsible for any injury (including death), damage or loss (including reasonable attorneys fees and expenses) which is caused by the sole negligence of an Indemnified Contractor Party, nor shall Owner be held responsible for the concurrent negligence of an Indemnified Contractor Party.

As a condition precedent to the duties to indemnify, defend and/or hold harmless (collectively “Indemnification”) established in this contract, the indemnified party must provide prompt notice to the indemnitor of a claim or matter for which Indemnification is sought, must allow the indemnitor to select counsel and control the defense, must cooperate with indemnitor at indemnitor’s expense, and must allow the indemnitor to settle the matter at its expense.

3.4 Bonds. Before entering upon the performance of this Agreement, Contractor shall execute for the benefit of Owner, a good and sufficient Performance Bond and Payment Bond, in form acceptable to Owner. Each bond shall be in an amount equal to the Contract Price (as defined below in Section 5 of this Agreement).

The Performance Bond shall also be a guarantee for the repair or replacement of any portion of the Project that is defective to and including the date of Owner's Final Acceptance of the Project. The Payment Bond shall be a guarantee for the payment for labor, materials and equipment furnished for use in the performance of Contractor's obligations hereunder. The Performance and Payment Bond will cease effective the date of Owner's Final Acceptance of the Project. Effective immediately after, a Maintenance Bond will be provided for the one-year period commencing on the date of Owner's Final Acceptance of the Project in the amount of 10% of the total Contract Price. The surety which executes the Performance Bond and Payment Bond will waive any right to independent notice under this Agreement if Contractor receives such notice, and consents to any
extensions of time, modification, waiver, forbearance, or change which may be made in any of the terms and conditions of the Agreement by the parties or by their successors or assigns. Notwithstanding any other provision of this Agreement or the bonds, in no event and in no manner shall coverage under the Performance Bond and Payment Bond extend to Section 3.5, Energy Savings Guarantee, as set forth in Exhibit B Energy Savings Guarantee and Measurement and Verification Plan, or any related provisions.

3.5 Guaranteed Savings. The Project will result in energy savings in the total amount of $_______ and operational savings in the total amount of $_______, as outlined in Exhibit B - Energy Savings Guarantee and Measurement and Verification Plan, during the __ year period following Final Acceptance of the Project (herein the “Total Guaranteed Savings”). Contractor represents and warrants that such Total Guaranteed Savings exceed Owner’s total cost of the Project.

It is agreed that the Contractor’s obligation to deliver the operational savings described in Table A of Exhibit B will be fully satisfied upon Owner’s Final Acceptance of the Project based on the documentation and data approved by Owner and included herein. Contractor represents and warrants the requirements set forth in Exhibit E, State Law Requirements, will be met.

3.6 Limitation of Liability. The total liability of Contractor on all claims, whether in contract, warranty, tort, strict liability, indemnity, or otherwise, arising out of the performance of this Agreement, shall not exceed the Contract Price. NOTWITHSTANDING ANY OTHER PROVISION HEREIN TO THE CONTRARY, IN NO EVENT SHALL CONTRACTOR BE LIABLE FOR INDIRECT, CONSEQUENTIAL, SPECIAL, SPECULATIVE, PUNITIVE, OR REMOTE DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE, COST OF CAPITAL, AND DOWN TIME COST.

3.7 Insurance.

3.7.1 Obtaining Proper Insurance. Contractor shall not commence performance hereunder until (i) it has obtained and Owner has approved all insurance coverage required by this Section 3.7; and (ii) Owner has been furnished with a certificate of insurance properly evidencing and confirming that Owner is an additional insured on Contractor's public liability
and automobile liability policies. In the event that subcontractors are not covered by Contractor's policies of insurance, each subcontractor shall secure policies of insurance which meet the requirements of this Section 3.7, with consideration given to the value and risk associated with performance of the subcontracted work.

3.7.2 Amount of Insurance. Contractor shall take out and maintain, at its sole cost and expense, the following insurance coverage during the term of this Agreement and all other times during which Contractor, its employees, agents, or subcontractors shall be present at the Facilities, whether performing or correcting any portion of the Project:

(A) Worker's Compensation, Employer's Liability, and Occupational Disease Insurance. Statutorily required worker's compensation insurance, including employer's liability and occupational disease coverage, to the extent mandated by applicable state law, on all of Contractor's employees engaged in the Project;

(B) Public Liability. Commercial general liability insurance (including contractual, independent contractors, explosion, and product/completed operations coverages) against damage because of bodily injury, including death, or damage to property of others, such insurance to afford protection to the limit of not less than One Million Dollars ($1,000,000.00) in one occurrence, and to the limit of not less than Two Million Dollars ($3,000,000.00) annual aggregate;

(C) Automobile Liability. Automobile liability insurance against damage because of bodily injury, including death, or damage to property of others as the result of the operation of any automobile owned or hired by Contractor, with such insurance to afford protection to the limit of not less than Five Hundred Thousand Dollars ($500,000.00) for any one person, not less than One Million Dollars ($1,000,000.00) in respect to any one accident, and not less than One Hundred Thousand Dollars ($100,000.00) for property damage.
(D) **Excess Liability.** Excess liability in an amount not less than Five Million Dollars ($5,000,000.00) which shall be specifically endorsed to be in excess of the above-required required public liability, the employers’ liability coverage portion on the workers’ compensation policy, and the automobile liability coverage.

(E) **Professional (E&O) Liability.** Professional liability insurance affording protection against claims associated with professional errors and omissions sufficient to afford protection of not less than $2,000,000 per claim.

3.8. **Property Insurance**

3.8.1. Owner shall purchase and maintain property insurance upon the Work at the Facilities in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the terms and conditions or required by law). This insurance shall:

(A) include the interests of Owner and Contractor, their respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

(B) be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of laws or regulations, water damage (including flood), and such other perils or causes of loss as may be specifically required by the terms and conditions;

(C) include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

(D) cover materials and equipment stored at the Facilities or at another location that was agreed to in writing by Owner prior to being incorporated in the
Work, provided that such materials and equipment have been included in an application for payment submitted by the Contractor;

(E) allow for partial utilization and beneficial use of the Work by Owner;
(F) include testing and startup; and
(G) be maintained in effect until the Substantial Completion Date unless otherwise agreed to in writing by Owner and Contractor with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

3.8.2. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by this Agreement or applicable laws or regulations, which will include the interests of Owner and Contractor their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

3.8.3. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Section 3.8 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 4.0.

3.8.4. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 3.8 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the terms and conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

3.8.5. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 3.8, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate change order. Prior to commencement of the Work at the Facilities, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.
3.9. **Waiver of Rights Relating to Insurance.** Owner and Contractor intend that all policies purchased in accordance with this Agreement will protect them and other individuals or entities identified in the terms and conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued. Furthermore, none of the above waivers shall apply to ESG’s obligations associated with an Annual Savings and Revenues Shortfall, as described within its Guarantee at Exhibit B.

4. **Title and Risk of Loss.** Risk of Loss for all equipment and materials provided by Contractor or any subcontractor pursuant to this Agreement shall transfer to Owner upon installation of such equipment and materials to Owner’s Facilities. Title to a Measure shall vest with Owner upon the earlier occurrence of (i) installation and payment for such Measure(s) to Contractor; (ii) the Owner’s written acceptance of a particular Measure or Facility, as the case may be, in the form of Schedule 2 (the “Partial Acceptance Certificate”); or (iii) the Owner’s written acceptance of the entire Project in the form of Schedule 1 (the Owner’s “Final Acceptance Certificate”). It is the intent of all parties that any transfer of title to Owner pursuant to this Agreement shall occur automatically without the necessity of any bill of sale, certificate of title, or other instrument of conveyance.

Owner shall be responsible for operating and maintaining all Measures that are installed. Further, Owner represents that it is a governmental entity and that it will cooperate with Contractor and will provide the same with appropriate documentation so that the Contractor may establish that it shall not be required to pay taxes, fees, assessments, or other charges of any character which may be imposed or incurred by any governmental or public authority as an incident to title to, ownership of, or operation of the ECMs installed during this Project.

5.1 Contract Price. In consideration of Contractor’s performance of the work necessary for the completion of the Project, Owner shall pay Contractor the sum of _____________________________ Dollars ($____) (herein the “Contract Price”), in accordance with the provisions of this Section 5.

5.2 Concerning Payment of the Contract Price. The following provisions shall apply to payment of the Contract Price:

5.2.1 Applications for Payment. Payment of the Contract Price shall be made in monthly installments based upon Contractor’s progress in completing the installation of the Project, except that Contractor shall be paid an “Initial Payment” equal to 25% of the Contract Price, which shall compensate Contractor for preconstruction Work and services performed at Contractor’s sole cost and risk prior to the execution of this Agreement. The request for such Initial Payment shall be submitted to Owner upon the execution and delivery of this Agreement. Contractor shall not submit to Owner any additional invoices until such time as Contractor has performed Work with a cumulative value in excess of the Initial Payment described herein.

With respect to monthly progress payments, Contractor shall submit to Owner each month, an application for payment on a form mutually agreeable to Contractor and Owner. Owner shall pay or cause to be paid invoice for such payments within 30 days of receipt. For payments not timely made, interest shall accrue at 10% per annum.

5.2.2 Completion and Inspection; Acceptance. When Contractor reasonably believes that an ECM, a Facility or the entire Project is substantially complete, it shall notify Owner that such ECM, Facility or the entire Project is ready for inspection and acceptance (or, ESG’s “Notice of Substantial Completion”). Within five business days following such notification, the Owner shall commence to conduct such inspections as it deems necessary or appropriate in order to determine that the ECM, Facility, or the entire Project, as the case may be, is free from defects and that the installation of the ECM, Facility, or the entire Project, as the case may be, has been completed in conformity with the Contract Documents. If any
aspect of the ECM, Facility, or the entire Project, as the case may be, shall be incomplete as of the date of such inspection, Owner shall notify Contractor in writing as to the items that render the ECM, Facility, or the entire Project, as the case may be, incomplete (such writing herein referred to as the "Punch List").

Contractor shall, at its expense and without further cost to Owner, undertake to perform such work as will complete the Punch List in compliance with the Contract Documents as soon as practicable. Contractor retains the right to dispute that an item or items on the Punch List is required by the Contract Documents. If Contractor does not satisfactorily complete the Punch List by a date 30 days following Owner's submission of the Punch List (herein the “Completion Date”), Owner shall have the right to order Contractor to stop any further work in respect of the particular ECM, Facility, or the entire Project, as the case may be, and Owner shall be entitled to complete the Punch List. In such event, Contractor shall be responsible for all costs incurred by Owner in completing the Punch List and Owner shall have the right to deduct all costs from any payment then or thereafter due to Contractor. If such cost exceeds the balance of the Contract Price then or thereafter due Contractor, Contractor shall pay such excess to Owner within 10 days following Owner's demand therefor.

Periodically during the performance of the Project, the Owner agrees to provide Contractor with written notice of the Owner's acceptance of a particular ECM or Facility, as the case may be, in the form of Schedule 2 (the “Partial Acceptance Certificate”). Following the Completion Date, Owner agrees to provide Contractor prompt written notice of its acceptance of the entire Project by executing and delivering Schedule 1 to the Contractor (the Owner's “Final Acceptance Certificate”) upon satisfaction of the following conditions:

A. Contractor shall have completed the Punch List to Owner's reasonable satisfaction and Contractor shall have corrected any other non-conforming items or condition, if any, reported to it by Owner;
B. Contractor shall have furnished to Owner's reasonable satisfaction, evidence that all equipment and labor costs incurred or accrued in connection with a particular ECM or Facility have been or will be promptly paid; and
C. Contractor shall have delivered to Owner all drawings and documents required to be furnished by Contractor pursuant to the Contract Documents.
If Owner is required to complete the Punch List, the date of Final Acceptance shall be extended to the date upon which the Project is completed by Owner, or any person retained by Owner, in accordance with the Contract Documents.

5.2.3 **Final Payment.** Any sums due and owing in respect of the Contract Price shall be payable to Contractor within 10 calendar days after the date Owner delivers a signed Schedule 1 to the Contractor, signifying the Owner’s Final Acceptance of the entire Project.

6. **Independent Contractor.** It is understood and agreed by the parties hereto that Contractor shall perform the Project according to its own means and methods and shall for all purposes be an independent contractor. All persons employed by Contractor in connection with the Project shall be paid directly by Contractor, and shall be subject to Contractor's orders and supervision.

7. **Inspection; Defective Work.** Contractor shall provide sufficient, safe, and proper facilities at all times for the inspection of the work by Owner. It shall, within forty-eight hours after receiving written notice from Owner to that effect, proceed to remove from the Facilities all materials that fail to conform to the Contract Documents.

8. **Termination.**

8.1 **Owner’s Right to Terminate.** Should Contractor fail to perform any material term or condition of the Contract Documents, Owner shall be at liberty, after 30 days written notice to Contractor and Contractor's failure to remedy the problem within that time period, to terminate this Agreement and to enter upon the Facilities and take possession of the equipment and materials for the purpose of completing the work to be done under this Contract, to use all materials of Contractor available for such work, and to employ any other person or persons to finish the work and to provide such additional materials therefor as may be necessary; and in case of such termination of the employment of Contractor, Contractor shall not be entitled to receive any further payment under this Contract until the work shall be wholly finished, at which time if the unpaid balance of the amount to be paid under the Contract shall exceed the expense incurred by Owner in finishing the work, such excess shall be paid by Owner to Contractor, but if such expense shall exceed such unpaid balance,
Contractor shall pay the excess to Owner. The expenses incurred by Owner as herein provided, either for the furnishing of materials or for finishing the work, and any damage incurred through such fault of Contractor shall be certified by Owner, and payment shall be made upon such certification.

8.2 Contractor's Right to Terminate or Stop Work. Should Owner fail to perform any material term or condition of the Contract Documents, Contractor shall be at liberty, after 30 days written notice to Owner and Owner's failure to remedy the problem within that time period, to terminate this Agreement or stop work. If Contractor elects to stop work, Contractor shall not be required to recommence work until such time as Owner has completely remedied its breach.

9. Delays. Should Contractor be obstructed or delayed in the prosecution or completion of the Project by the act, negligence, delay, or default of Owner or by any other damage, act or cause beyond the reasonable control of Contractor or any subcontractor, then the time herein fixed for the completion of the work shall be extended for a period equivalent to the time lost by reason of such event. If Contractor is delayed by actions or inactions of Owner or its agents or employees, Owner shall be required to reimburse Contractor for its additional costs incurred as a result of such delay.

10. Contractor to Furnish Required Statements. Contractor shall provide all statements, affidavits, waivers, and other instruments required by state or federal law or regulation or by local ordinances or rules, at such times and in the form required by said laws, regulations, ordinances, or rules, and Contractor hereby acknowledges receipt of notice from Owner to furnish same.

11. Nondiscrimination in Hiring Employees.

A. Contractor, any subcontractor, any supplier or any sub-supplier of a party to this Contract shall not discriminate against any employee or applicant for employment to be employed in the performance of this Contract with respect to his or her hire, tenure, terms, conditions, or privileges of employment or any matter directly or indirectly related to employment, because of his race, color, religion, sex, disability, national origin, or ancestry or military status. Breach of this provision may be regarded as a material breach of this Contract.
B. Since this Contract involves the construction, alteration, or repair of a public building or public work, Contractor agrees:

(1) That in the hiring of employees for the performance of work under this Contract or any subcontract hereunder, Contractor, subcontractor or any person acting on behalf of Contractor or subcontractor shall not, by reason of race, religion, color, sex, national origin, or ancestry, discriminate against any citizen of the State of Pennsylvania who is qualified and available to perform the work to which the employment relates;

(2) That Contractor, a subcontractor, or any person on his or their behalf shall not, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, religion, color, sex, national origin, or ancestry;

C. Contractor or any subcontractor of Contractor shall be required to pay for each class of work on such project a scale of wages which shall in no case be less than the common construction wages being paid in the immediate locality for such class of work. As part of this Contract, if applicable, there is incorporated by reference herein a prevailing scale of wages.

12. **Miscellaneous Provisions.**

12.1. **Governing Law.** This Agreement shall be construed in accordance with and governed by the laws of the State of Pennsylvania.

12.2. **Notices.** Unless otherwise specifically provided herein, any notice, consent, request, demand, report or statement (herein "Notice"), which is required or permitted to be given to or served upon either party hereto by the other party hereto under any of the provisions of this Agreement shall be in writing and deemed to be duly delivered when (i) personally delivered to Contractor, or personally delivered to Owner in the case of a Notice to be given to Owner, or (ii) deposited in the United States mail, registered or certified, postage prepaid, and properly addressed as follows:
12.3. **Allocation of IRC 179D or Similar Income Tax Deduction Benefits.** As a result of ESG’s design and implementation of this Project, a federal income tax deduction under Section 179D of the Internal Revenue Code (“IRC 179D”) may become available to ESG as the party primarily responsible for designing energy efficiency improvements implemented at Owner’s Facilities. Congress provided in IRC 179D(d)(4) for government owners, which do not pay income tax and are thus ineligible to use this deduction, to allocate the deduction to the party primarily responsible for designing the energy efficiency improvements, here ESG. Owner hereby agrees to allocate to ESG such deduction and any similar deduction enacted by Congress to replace IRC 179D. Owner agrees to cooperate with ESG by executing annually during the construction of the Measures, and promptly returning to ESG, a written allocation and declaration required by IRC 179D. ESG will prepare and is responsible for the accuracy of any allocation documents and all accompanying documentation supplied for Owner's signature. Notwithstanding anything to the contrary herein, Owner makes no representation concerning the availability or applicability of any
such tax deduction benefits or of their ability to be allocated to or claimed by ESG. ESG assumes all risk related to such allocation and deduction.

12.4. **Claims for Damages.** Any claims by either party hereto for bodily injury or damage to personal property caused by any act or omission of the other party hereto or by any of such party's employees or agents or others for whose acts it is legally liable shall be made in writing to such other party within a reasonable time after the occurrence or first knowledge of such injury or damage.

12.5. **Assignment.** Neither party shall assign, transfer, pledge, or grant any security interest in, or otherwise dispose of, this Agreement or the equipment or any interest in this Agreement or the Equipment without first obtaining the other party's written consent. Subject to the foregoing, this Agreement shall inure to the benefit of and is binding upon the heirs, executors, administrators, successors, and assigns of the parties hereto.

12.6. **Waivers.** The failure of either party hereto to insist upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights unless such waiver is in writing and signed by both parties.

12.7. **Remedies Cumulative.** Each remedy provided for by the Contract shall be cumulative and in addition to every other remedy provided for herein, by law or in equity. Upon the occurrence of a default, hereunder, either party, or its assignee, may, at its option, exercise any right, remedy, or privilege which may be available to it under applicable law, including the right to (i) proceed by appropriate court action to enforce the terms of this Agreement, and (ii) recover damage for breach of this Agreement. Notwithstanding the exercise of any right, remedy or privilege, the parties shall remain liable for all covenants and indemnities under this Agreement.

12.8. **Tests.** If the Contract Documents or the laws, ordinances, rules, or regulations of any public authority having appropriate jurisdiction require inspection, testing, or approval of any of the work, Contractor shall give Owner timely notice of Contractor's readiness for such inspection, testing, or approval and of the date thereof so that Owner may be present to observe such inspection, testing, or approval by such public authority. Contractor shall be responsible for and pay all costs for any such inspection, testing, or approval unless otherwise provided for herein. All required
licenses, permits, or certificates applicable to any such inspection, testing, or approval shall be obtained by Contractor and promptly delivered to Owner.

12.9. **Hazardous Materials.** If during the performance of the services related to the Project, the presence of Hazardous Materials is discovered or reasonably suspected, Contractor shall notify Owner of such discovery or suspicion and shall be permitted to immediately cease all work that may require contact with or exposure to such hazardous materials until Owner has inspected the same and Owner has made arrangements for the removal of the same at its expense. Contractor shall be entitled to an extension of the time fixed for the completion of the work equivalent to the time required to remediate such Hazardous Material. “Hazardous Materials” includes all hazardous or toxic substances or materials as may be so designated by federal, state or local governmental entities. Including without limitation, asbestos, mold, lead paint and soil or water contamination of any kind, unless expressly included within the Scope of Work.

12.10. **Amendments.** No amendment, supplement, or modification hereof shall be effective for any purpose unless the same is in writing and signed by both parties hereto.

12.11. **Headings.** The headings of sections and subsections of this Agreement are for convenience of reference only and shall not affect the meaning or construction of any provision hereof.

12.12. **Entire Agreement.** This Agreement, together with the Contract Documents, represents the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior negotiations, representations and agreements whether written or oral.

12.13. **Review by Counsel.** This Contract has been reviewed by counsel selected by the Owner, who has issued an opinion consistent with the form Opinion of Owner’s Counsel, identified within Exhibit D, hereto.

[Remainder of page intentionally left blank; signature page to follow.]
12.14. **Authority to Execute Contract.** This Contract is executed by Owner pursuant to a resolution of Owner duly adopted at its regular meeting called and held on the ______ day of ____________, 20__. 

LOWER MERION TOWNSHIP, PENNSYLVANIA

By________________________________________

Its________________________________________

ATTEST:

By________________________________________

Its________________________________________

ENERGY SYSTEMS GROUP, LLC

By________________________________________

Gregory F. Collins

Its President________________________________

ATTEST:

By________________________________________

Its________________________________________
SCHEDULE 1

FINAL ACCEPTANCE CERTIFICATE

(The parties agree and acknowledge that this Final Acceptance Certificate shall be used to signify the Owner's Final Acceptance of the Project pursuant to Section 5.2.2 of the Agreement.)

Energy Systems Group, LLC
9877 Eastgate Court
Newburgh, IN 47630

Re: Guaranteed Energy Savings Performance Contract, dated as of __________ , 20__ (the “Agreement”), between Energy Systems Group, LLC (the “Contractor”) and Lower Merion Township, Pennsylvania (the “Owner”).

Ladies and Gentleman:

In accordance with the Agreement, Owner hereby certifies and represents to, and agrees with, Energy Systems Group, LLC as follows:

The entire Project (as defined in the Agreement) has been delivered, installed, and accepted as of __________ __________ (the “Final Acceptance Date”).

Owner has conducted such inspection and/or testing of the entire Project, as it deems necessary and appropriate, and hereby acknowledges that it accepts the entire Project for all purposes.

No event or condition that constitutes, or with notice or lapse of time, or both, would constitute, an Event of Default (as defined in the Agreement) exists at the date hereof.

Sincerely,

LOWER MERION TOWNSHIP, PENNSYLVANIA

By: ____________________________

Its: ____________________________

Date: ____________________________

19
PARTIAL ACCEPTANCE CERTIFICATE

(The parties agree and acknowledge that the substance of this Partial Acceptance Certificate shall be used to signify the Owner’s periodic Acceptance of designated portions of the Project.)

Energy Systems Group, LLC
9877 Eastgate Court
Newburgh, IN 47630

Re: Guaranteed Energy Savings Performance Contract, dated as of __________, 20__ (the “Agreement”), between Energy Systems Group, LLC (the “Contractor”) and Lower Merion Township, Pennsylvania (the “Owner”).

Ladies and Gentleman:

In accordance with the Agreement, Owner hereby certifies and represents to, and agrees with, Energy Systems Group, LLC as follows:

The ECM (or ECMs), Facility (or Facilities), as the case may be, (as defined in the Agreement) have been delivered, installed, and accepted as of ______________ (the “Acceptance Date”).

Owner has conducted such inspection and/or testing of the ECM (or ECMs), Facility, as the case may be, as it deems necessary and appropriate and hereby acknowledges that it accepts the ECM (or ECMs), Facility, as the case may be, for all purposes.

No event or condition that constitutes, or with notice or lapse of time, or both, would constitute, an Event of Default (as defined in the Agreement) exists at the date hereof.

Sincerely,

LOWER MERION TOWNSHIP, PENNSYLVANIA

By: ______________________________________

Its: _______________________________________ 

Date: _______________________________________
### SCHEDULE 3

**ANTICIPATED PAYMENT REQUEST DRAW SCHEDULE**

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>30%</td>
</tr>
<tr>
<td>Job Final</td>
<td>10%</td>
</tr>
</tbody>
</table>
EXHIBIT A
SCOPE OF WORK

To be inserted
EXHIBIT B

ENERGY SAVINGS GUARANTEE AND MEASUREMENT AND VERIFICATION PLAN

To be inserted
SUPPORT SERVICES AGREEMENT

ENERGY SERVICES GUARANTEE REPORTING

As part of the Energy Guarantee, Energy Systems Group, LLC will provide annual Energy Services Guarantee Report for the annual sum of $______. The initial annual fee will be billed upon Final Acceptance of the Project, and subsequently billed annually through the <__>-year period of the Energy Guarantee.

During the term of the Agreement, Owner may cancel the annual Energy Services Guarantee Report by providing written notice to ESG at least 30 days prior to the beginning of the next annual guarantee period. If Owner makes such request to cancel the annual Energy Services Guarantee Reports, the parties agree that ESG will no longer be obligated to perform the remaining annual Energy Services Guarantee Reports, and the energy savings guaranteed by ESG during the term of the Agreement shall be considered fully satisfied and the Agreement will terminate.

Additionally, if Owner fails to pay the annual Energy Services Guarantee Reports fee within 60 days of receipt of the annual Energy Services Guarantee Reports fee invoice, ESG has the right to terminate this Support Services Agreement. In this event, both parties agree that the energy savings guarantee provided by ESG during the term of the Agreement shall be considered fully satisfied. Both parties further agree that upon this occurrence ESG will no longer be obligated to perform the remaining annual Energy Services Guarantee Reports, and the energy savings guarantee contained in the Agreement will be considered satisfied in full and the Agreement will terminate. The cost of the annual fee will be escalated at three percent per year.

Agreed to by the Owner and Contractor this ____ day of ________, 20__.  

LOWER MERION TOWNSHIP, PENNSYLVANIA

By ____________________________

Its ____________________________

ENERGY SYSTEMS GROUP, LLC

By ____________________________

Gregory F. Collins

Its ____________________________

Its ___ President __________________
Energy Systems Group, LLC
And Its Assignee
9877 Eastgate Court
Newburgh, IN 47630

Ladies and Gentlemen:

I am counsel for the Lower Merion Township, Pennsylvania ("Owner"). In order to render this opinion I have reviewed the Guaranteed Energy Savings Performance Contract (the "Agreement"), dated as of ________________, 20__, between Owner and Energy Systems Group, LLC ("Contractor"), and other documents and instruments related to the Agreement or otherwise necessary to render this opinion, as well as all proceedings taken by Owner in connection with the Agreement. Capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Agreement. Based upon the foregoing it is my opinion that:

1. Owner is a duly organized and validly existing political subdivision of the State of Pennsylvania and is a political subdivision within the meaning of Section 103 of the Internal Revenue Code and related regulations and rulings.

2. Owner has the power and authority to execute and perform the Agreement and to purchase ECMs from Contractor thereunder.

3. The Agreement and related instruments and documents:
   (a) Have been duly authorized by appropriate resolutions;
   (b) Do not contravene and will not violate or result in a default under any charter, certificate of incorporation, by-laws, indenture, or any other agreement or instrument by which Owner or its property is bound or to which Owner is a party;
   (c) The Agreement has been duly executed by the duly authorized officers of Owner, and do and will constitute the legal, valid, and binding obligations of Owner enforceable against Owner in accordance with their respective terms.

4. No approval or consent is required from any governmental authority with respect to the entering into or performance by Owner of the Agreement and the transactions contemplated thereby or if any such approval is required it has been duly obtained.

5. No litigation or other proceedings are pending or, to the best of my knowledge, threatened against Owner which would adversely affect Owner's legal title to the ECMs or, if decided adversely to Owner, would materially affect its financial condition.

This opinion is for the benefit of the addressee and any Assignee, and you and such Assignee and any counsel engaged by you or such Assignee shall be entitled to rely hereupon, including such counsel's reliance hereupon in giving its opinion addressed to other persons.

Very truly yours,
EXHIBIT E

STATE SPECIFIC STATUTORY REQUIREMENTS

This Agreement must be performed in conformance with the requirements of requirements of the Guaranteed Energy Savings Act, as amended, which is otherwise referred to as “Act 57” of 1998, 62 Pa. C.S. §3751-3757, as amended under Act 77 of 2004 and Act 39 of 2010.
EXHIBIT F

PREVAILING WAGE DETERMINATION

To be inserted prior to contract signing.
Appendix 3: Sample Measurement and Verification Plan – ESCOs shall provide description of the method to be used to measure energy savings achieved in the Township through the efforts of the ESCO (including any methods to be used to adjust for factors such as weather or changes in the use or structure of the buildings should be included in the Proposal). The following sections of the plan, at a minimum, shall be completed:

6.10.1 The base line, which will be utilized for auditing purposes.
6.10.2 Current operating schedules and conditions.
6.10.3 Proposed weather adjustment practices, which will be utilized to calculate and/or verify annual cost savings that have been achieved by the implementation of Energy Conservation Measures resulting from the implementation of this project.
6.10.4 Reference to the types of M&V options to be applied per the IPMVP procedures/protocols.

Based on the facilities listed in the RFP, and the technologies that are expected to be installed and customer’s need for infrastructure improvements, Energy Systems Group (ESG) recommends a 20-year financing term, and savings guarantee of 20-years.

ESG measurement and verification (M&V) and guarantee methodologies are in full compliance with those defined in the North American Energy Measurement and Verification Protocol (NAEMVP) or International Performance Measurement and Verification Protocol (IPMVP) prepared by the Efficiency Valuation Organization (EVO).

ESG guarantees energy savings using the most appropriate methodology for accuracy and cost effectiveness. ESG typically guarantees up to 95% of the total calculated energy and operational savings. Due to the sophistication and diversity of the energy conservation measures that can be included in a guaranteed energy savings contract, it is likely ESG will use multiple methodologies and data collection techniques to arrive at the best application for each facility. During the Technical Analysis/Audit Phase, ESG will, in consultation with LMT, determine the most appropriate M&V methodology for each measure at each facility.

Standards of quality will be implemented to ensure ongoing quality assurance in the M&V process. In some applications, and in an effort to establish a more precise baseline, ESG engineers will install data-loggers to collect real-time data on specific systems. We believe “if you can’t measure it, you can’t save it”. All metering, monitoring, and reporting will be performed in a consistent and logical manner. If metering and monitoring reports are used to calculate savings, the reports will address what was measured, with which meter, how, when, and by whom. Calibration of sensors and meters will be performed to the manufacturer’s specifications against known standards.

The duration of any metering and monitoring will be sufficient to ensure accurate representation of the average amount of energy used by the affected equipment during all phases of measurement and verification. The measurements will be taken at typical system outputs that best represent the entire system. A statistically correct representative number of sample measurements will be taken to determine the appropriate/averaged resultant measurement.
Measurement and Verification (M&V) Options

M&V guidelines are grouped into four categories: Options A, B, C and D. Having four options provides a range of approaches to determine energy savings with varying levels of uncertainty, cost and methodology. A particular option is chosen based on the specific project feature.

These features include the following:

- The complexity of the ECM.
- Minimizing the risk of savings being achieved.
- The potential for changes in key factors between the baseline period and the performance period.

Determining Savings

After the Energy Conservation Measure (ECM) or system is installed, energy savings are determined at a single occurrence, continuously or at regular intervals, as outlined in the contract. Baseline energy use, post-installation energy use and utility (and cost) savings can be determined using one or more of the following M&V techniques:

- Engineering Calculations
- Metering and Monitoring
- Utility Meter Billing Analysis (e.g., EnergyCap™ energy accounting software)
- Computer Simulations (e.g., DOE-2 analysis).

The savings calculation approach is generally dependent on the M&V option and method selected for the measure. In some instances, a combined M&V option approach is best suited for the measure. For example, for a building with multiple measures, a combination of Option A and Option B may be used for different measures.

Numerous factors can affect energy savings during the term of a contract. These factors include weather, occupancy, operating hours, equipment schedules, equipment maintenance, and equipment loads. How adjustments are made to the baseline if post-installation conditions are different than baseline conditions is dependent upon the M&V method option being implemented.

The options differ in their approach regarding the level and duration of baseline and performance period measurements. M&V evaluations for both options A and B are made at the retrofit or system level. Option C evaluations are made at the whole-building or whole-facility level. Option D evaluations, which involve computer simulation modeling, are made at either the retrofit or the whole-building level (for model calibration purposes). Regardless of which option or combination of options, ESG will provide LMT with annual reports and interim feedback, especially if any issues seem to be apparent.

The floor utility usage & rates for Electric, Natural Gas, & Propane are listed in the “Baseline Summary” on the next page.
<table>
<thead>
<tr>
<th>Building ID</th>
<th>Building Name</th>
<th>Address</th>
<th>Electric</th>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Project Wide</td>
<td></td>
<td>$0.00</td>
<td>$0.834</td>
</tr>
<tr>
<td>1</td>
<td>Ardmore Community Center</td>
<td>122 Ardmore Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.830</td>
</tr>
<tr>
<td>2</td>
<td>Ardmore Ave Pool Complex</td>
<td>122 Ardmore Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.830</td>
</tr>
<tr>
<td>3</td>
<td>Ardmore Library</td>
<td>108 Ardmore Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.843</td>
</tr>
<tr>
<td>4</td>
<td>Bala Cynwyd Library</td>
<td>131 Old Lancaster Road / 150 N. Highland Ave</td>
<td>$0.00</td>
<td>$0.834</td>
</tr>
<tr>
<td>5</td>
<td>Belmont Community Center</td>
<td>50 Ashland Ave, Bala Cynwyd 19004</td>
<td>$0.00</td>
<td>$0.838</td>
</tr>
<tr>
<td>6</td>
<td>Belmont Hills Pool Complex</td>
<td>Mary Waterford Rd &amp; Smith Dr, Belmont Hills</td>
<td>$0.00</td>
<td>$0.838</td>
</tr>
<tr>
<td>7</td>
<td>Belmont Hills Library</td>
<td>120 Mary Waters Ford Road, Bala Cynwyd</td>
<td>$0.00</td>
<td>$0.811</td>
</tr>
<tr>
<td>8</td>
<td>Bryn Mawr Community Center</td>
<td>9 Bryn Mawr Ave, Bryn Mawr 19010</td>
<td>$0.00</td>
<td>$0.875</td>
</tr>
<tr>
<td>9</td>
<td>County Line Complex</td>
<td>County Line Road, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.843</td>
</tr>
<tr>
<td>10</td>
<td>Domestic Animal Detention Center (Keogler Center)</td>
<td>1300 North Woodline Ave, Penn Valley 19072</td>
<td>$0.00</td>
<td>$0.875</td>
</tr>
<tr>
<td>11</td>
<td>Ludington Library</td>
<td>5 S Bryn Mawr Ave, Bryn Mawr, PA 19010</td>
<td>$0.00</td>
<td>$0.756</td>
</tr>
<tr>
<td>12</td>
<td>PAL M Building</td>
<td>117 Ardmore Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.826</td>
</tr>
<tr>
<td>13</td>
<td>Penn Wynne Library</td>
<td>130 Overbrook Parkway, Wynnewood 19096</td>
<td>$0.00</td>
<td>$0.883</td>
</tr>
<tr>
<td>14</td>
<td>Public Safety Building</td>
<td>71 E Lancaster Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.719</td>
</tr>
<tr>
<td>15</td>
<td>Street Lights</td>
<td>0</td>
<td>$0.00</td>
<td>$0.000</td>
</tr>
<tr>
<td>16</td>
<td>Township Administration Building</td>
<td>75 Lancaster Ave, Ardmore 19003</td>
<td>$0.00</td>
<td>$0.710</td>
</tr>
<tr>
<td>17</td>
<td>Traffic Lights</td>
<td>0</td>
<td>$0.00</td>
<td>$0.000</td>
</tr>
<tr>
<td>18</td>
<td>Vernon Young</td>
<td>124 Ardmore Ave, Ardmore, PA 19003</td>
<td>$0.00</td>
<td>$0.830</td>
</tr>
<tr>
<td>19</td>
<td>Warner Ave (Park)</td>
<td>929 Old Lancaster Rd, Bryn Mawr, PA 19010</td>
<td>$0.00</td>
<td>$0.000</td>
</tr>
</tbody>
</table>
### Baseline Energy Usage – Electric

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Population</th>
<th>Square Feet</th>
<th>$/kw</th>
<th>Watts/ft²</th>
<th>Annual kWh</th>
<th>kWh/sq ft²</th>
<th>Total kWh</th>
<th>Total $</th>
<th>$/kWH</th>
<th>$/ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Community Center</td>
<td>0</td>
<td>6,420</td>
<td>$0.00</td>
<td>0.00</td>
<td>50,080</td>
<td>7.80</td>
<td>$7,420</td>
<td>$7,420</td>
<td>$0.148</td>
<td>$1.16</td>
</tr>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>0</td>
<td>3,500</td>
<td>$0.00</td>
<td>0.00</td>
<td>80,256</td>
<td>22.93</td>
<td>$7,785</td>
<td>$7,785</td>
<td>$0.097</td>
<td>$2.22</td>
</tr>
<tr>
<td>Ardmore Library</td>
<td>0</td>
<td>5,800</td>
<td>$0.00</td>
<td>0.00</td>
<td>75,120</td>
<td>12.95</td>
<td>$7,645</td>
<td>$7,645</td>
<td>$0.102</td>
<td>$1.32</td>
</tr>
<tr>
<td>Eala Cynwyd Library</td>
<td>0</td>
<td>45,600</td>
<td>$0.00</td>
<td>0.00</td>
<td>517,040</td>
<td>13.53</td>
<td>$59,177</td>
<td>$59,177</td>
<td>$0.056</td>
<td>$1.30</td>
</tr>
<tr>
<td>Belmont Community Center</td>
<td>0</td>
<td>8,165</td>
<td>$0.00</td>
<td>0.00</td>
<td>20,973</td>
<td>2.57</td>
<td>$2,799</td>
<td>$2,799</td>
<td>$0.133</td>
<td>$0.34</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>0</td>
<td>5,500</td>
<td>$0.00</td>
<td>0.00</td>
<td>158,800</td>
<td>28.51</td>
<td>$15,757</td>
<td>$15,757</td>
<td>$0.100</td>
<td>$2.86</td>
</tr>
<tr>
<td>Belmont Hills Library</td>
<td>0</td>
<td>4,210</td>
<td>$0.00</td>
<td>0.00</td>
<td>47,660</td>
<td>11.30</td>
<td>$5,447</td>
<td>$5,447</td>
<td>$0.115</td>
<td>$1.29</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>0</td>
<td>5,350</td>
<td>$0.00</td>
<td>0.00</td>
<td>53,400</td>
<td>6.78</td>
<td>$6,428</td>
<td>$6,428</td>
<td>$0.121</td>
<td>$0.68</td>
</tr>
<tr>
<td>County Line Complex</td>
<td>0</td>
<td>12,635</td>
<td>$0.00</td>
<td>0.00</td>
<td>52,320</td>
<td>4.85</td>
<td>$6,188</td>
<td>$6,188</td>
<td>$0.099</td>
<td>$0.48</td>
</tr>
<tr>
<td>Domestic Animal Detention Center</td>
<td>0</td>
<td>3,000</td>
<td>$0.00</td>
<td>0.00</td>
<td>9,000</td>
<td>0.00</td>
<td>$0</td>
<td>$0</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>0</td>
<td>40,000</td>
<td>$0.00</td>
<td>0.00</td>
<td>523,424</td>
<td>15.59</td>
<td>$57,500</td>
<td>$57,500</td>
<td>$0.052</td>
<td>$1.44</td>
</tr>
<tr>
<td>PALM Building</td>
<td>0</td>
<td>7,430</td>
<td>$0.00</td>
<td>0.00</td>
<td>107,224</td>
<td>14.43</td>
<td>$13,447</td>
<td>$13,447</td>
<td>$0.125</td>
<td>$1.81</td>
</tr>
<tr>
<td>Penn Wynne Library</td>
<td>0</td>
<td>6,300</td>
<td>$0.00</td>
<td>0.00</td>
<td>52,606</td>
<td>9.94</td>
<td>$5,708</td>
<td>$5,708</td>
<td>$0.110</td>
<td>$1.09</td>
</tr>
<tr>
<td>Public Safety Building</td>
<td>0</td>
<td>13,670</td>
<td>$0.00</td>
<td>0.00</td>
<td>438,460</td>
<td>35.73</td>
<td>$42,674</td>
<td>$42,674</td>
<td>$0.087</td>
<td>$3.12</td>
</tr>
<tr>
<td>Street Lights</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
<td>0.00</td>
<td>2,958,736</td>
<td>0.00</td>
<td>$223,143</td>
<td>$223,143</td>
<td>$0.210</td>
<td>$0.00</td>
</tr>
<tr>
<td>Township Administration Building</td>
<td>0</td>
<td>45,650</td>
<td>$0.00</td>
<td>0.00</td>
<td>904,880</td>
<td>10.60</td>
<td>$82,459</td>
<td>$82,459</td>
<td>$0.002</td>
<td>$1.81</td>
</tr>
<tr>
<td>Traffic Lights</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
<td>0.00</td>
<td>431,460</td>
<td>0.00</td>
<td>$36,757</td>
<td>$36,757</td>
<td>$0.085</td>
<td>$0.00</td>
</tr>
<tr>
<td>Vernon Young</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>$0</td>
<td>$0</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Warner Ave (Park)</td>
<td>0</td>
<td>0</td>
<td>$0.00</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>$0</td>
<td>$0</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>0</strong></td>
<td><strong>216,430</strong></td>
<td><strong>$0.00</strong></td>
<td><strong>6,738,413</strong></td>
<td><strong>31.13</strong></td>
<td><strong>$980,397</strong></td>
<td><strong>$980,397</strong></td>
<td><strong>$0.145</strong></td>
<td><strong>$4.53</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Baseline Energy Usage – Natural Gas

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Population</th>
<th>Square Feet</th>
<th>Therms</th>
<th>Btu/ft²</th>
<th>Total $</th>
<th>$/ft²</th>
<th>$/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Community Center</td>
<td>0</td>
<td>6,420</td>
<td>5,380</td>
<td>83,801</td>
<td>$4,354</td>
<td>$0.68</td>
<td>$0.81</td>
</tr>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>0</td>
<td>3,500</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ardmore Library</td>
<td>0</td>
<td>5,800</td>
<td>5,000</td>
<td>86,207</td>
<td>$4,161</td>
<td>$0.72</td>
<td>$0.83</td>
</tr>
<tr>
<td>Bala Cynwyd Library</td>
<td>0</td>
<td>45,600</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belmont Community Center</td>
<td>0</td>
<td>8,165</td>
<td>4,910</td>
<td>60,135</td>
<td>$4,053</td>
<td>$0.50</td>
<td>$0.83</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>0</td>
<td>5,500</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belmont Hills Library</td>
<td>0</td>
<td>4,210</td>
<td>1,420</td>
<td>33,729</td>
<td>$1,417</td>
<td>$0.34</td>
<td>$1.00</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>0</td>
<td>9,350</td>
<td>3,360</td>
<td>35,936</td>
<td>$2,902</td>
<td>$0.31</td>
<td>$0.86</td>
</tr>
<tr>
<td>County Line Complex</td>
<td>0</td>
<td>12,835</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Domestic Animal Detention Center</td>
<td>0</td>
<td>3,000</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>0</td>
<td>40,000</td>
<td>16,160</td>
<td>40,400</td>
<td>$12,027</td>
<td>$0.30</td>
<td>$0.74</td>
</tr>
<tr>
<td>PALM Building</td>
<td>0</td>
<td>7,430</td>
<td>5,830</td>
<td>78,466</td>
<td>$4,702</td>
<td>$0.63</td>
<td>$0.81</td>
</tr>
<tr>
<td>Penn Wynne Library</td>
<td>0</td>
<td>5,300</td>
<td>3,000</td>
<td>56,604</td>
<td>$2,566</td>
<td>$0.48</td>
<td>$0.86</td>
</tr>
<tr>
<td>Public Safety Building</td>
<td>0</td>
<td>13,670</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Street Lights</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Township Administration Building</td>
<td>0</td>
<td>45,650</td>
<td>44,840</td>
<td>99,226</td>
<td>$31,275</td>
<td>$0.69</td>
<td>$0.70</td>
</tr>
<tr>
<td>Traffic Lights</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vernon Young</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Warner Ave (Park)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>0</td>
<td>216,430</td>
<td>89,900</td>
<td>41,538</td>
<td>$67,457</td>
<td>$0.31</td>
<td>$0.750</td>
</tr>
</tbody>
</table>
## Lower Merion Township / PA Guaranteed Energy Savings Act

Response to Request for Proposals for an Energy/Operating Cost Reduction Program

Baseline Energy Usage – Total Utility Costs / Energy Use Index (EUI)

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Square Feet</th>
<th>Total Utility Cost</th>
<th>EUI - Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ardmore Community Center</td>
<td>6,420</td>
<td>$11,774</td>
<td>110,424</td>
</tr>
<tr>
<td>Ardmore Ave Pool Complex</td>
<td>3,500</td>
<td>$7,785</td>
<td>78,261</td>
</tr>
<tr>
<td>Ardmore Library</td>
<td>5,800</td>
<td>$11,806</td>
<td>130,411</td>
</tr>
<tr>
<td>Bala Cynwyd Library</td>
<td>45,600</td>
<td>$59,177</td>
<td>46,183</td>
</tr>
<tr>
<td>Belmont Community Center</td>
<td>8,165</td>
<td>$6,852</td>
<td>68,902</td>
</tr>
<tr>
<td>Belmont Hills Pool Complex</td>
<td>5,500</td>
<td>$15,757</td>
<td>97,302</td>
</tr>
<tr>
<td>Belmont Hills Library</td>
<td>4,210</td>
<td>$6,864</td>
<td>72,286</td>
</tr>
<tr>
<td>Bryn Mawr Community Center</td>
<td>9,350</td>
<td>$9,330</td>
<td>59,079</td>
</tr>
<tr>
<td>County Line Complex</td>
<td>12,835</td>
<td>$6,188</td>
<td>16,572</td>
</tr>
<tr>
<td>Domestic Animal Detention Center</td>
<td>3,000</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Ludington Library</td>
<td>40,000</td>
<td>$69,527</td>
<td>93,594</td>
</tr>
<tr>
<td>PALM Building</td>
<td>7,430</td>
<td>$18,149</td>
<td>127,719</td>
</tr>
<tr>
<td>Penn Wynne Library</td>
<td>5,300</td>
<td>$8,334</td>
<td>90,515</td>
</tr>
<tr>
<td>Public Safety Building</td>
<td>13,670</td>
<td>$42,674</td>
<td>121,959</td>
</tr>
<tr>
<td>Street Lights</td>
<td>0</td>
<td>$623,146</td>
<td>-</td>
</tr>
<tr>
<td>Township Administration Building</td>
<td>45,650</td>
<td>$113,734</td>
<td>165,131</td>
</tr>
<tr>
<td>Traffic Lights</td>
<td>0</td>
<td>$36,757</td>
<td>-</td>
</tr>
<tr>
<td>Vernon Young</td>
<td>0</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Warner Ave (Park)</td>
<td>0</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>216,430</strong></td>
<td><strong>$1,047,854</strong></td>
<td><strong>147,799</strong></td>
</tr>
</tbody>
</table>


The following table lists the various ECMs and the M&V protocol for each measure. Please note that the below table is provided as a sample of what the M&V options could look like. The ECMs and associated M&V protocols are dependent on the final contracted scope. The final M&V section will reflect the final contracted ECMs.

Table B.

<table>
<thead>
<tr>
<th>ECM Description</th>
<th>M&amp;V Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attic Insulation</td>
<td>A</td>
</tr>
<tr>
<td>Building Sealing &amp; weatherization</td>
<td>C</td>
</tr>
<tr>
<td>Install Air Curtain</td>
<td>A</td>
</tr>
<tr>
<td>Window Replacements</td>
<td>C</td>
</tr>
<tr>
<td>Boiler Replacements</td>
<td>C</td>
</tr>
<tr>
<td>Boiler Replacements - Condensing</td>
<td>C</td>
</tr>
<tr>
<td>Boiler Replacements (Furnace)</td>
<td>C</td>
</tr>
<tr>
<td>Chiller Replacement</td>
<td>C</td>
</tr>
<tr>
<td>New Controls</td>
<td>C</td>
</tr>
<tr>
<td>Update Controls</td>
<td>C</td>
</tr>
<tr>
<td>DHW Heater Replacement</td>
<td>C</td>
</tr>
<tr>
<td>Motor Replacement (Pool Pump)</td>
<td>A</td>
</tr>
<tr>
<td>LED Parking Lot Lighting</td>
<td>A</td>
</tr>
<tr>
<td>LED Site Lighting</td>
<td>A</td>
</tr>
<tr>
<td>LED Site Lighting - Completed</td>
<td>A</td>
</tr>
<tr>
<td>LED Wallpacks</td>
<td>A</td>
</tr>
<tr>
<td>Interior LED Lighting</td>
<td>A</td>
</tr>
<tr>
<td>Interior LED Lighting - Completed</td>
<td>A</td>
</tr>
<tr>
<td>Interior LED Lighting - HID</td>
<td>A</td>
</tr>
</tbody>
</table>
### Recommended M&V Options

<table>
<thead>
<tr>
<th>LED Atrium Lighting</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Lighting – Upgrade to LED Acorn New</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Acorn Retrofits</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Center</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Cobra</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Colonial</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Controls</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting – Upgrade to LED Tear Drop New</td>
<td>C</td>
</tr>
<tr>
<td>Street Lighting Audit</td>
<td>C</td>
</tr>
<tr>
<td>Recommission Controls</td>
<td>C</td>
</tr>
<tr>
<td>Recommission Controls &amp; Air Side Systems</td>
<td>C</td>
</tr>
<tr>
<td>Recommission Controls &amp; Boiler Plant</td>
<td>C</td>
</tr>
<tr>
<td>RTU Replacements</td>
<td>A</td>
</tr>
<tr>
<td>DX Unit Replacements</td>
<td>A</td>
</tr>
</tbody>
</table>
Our guarantee ensures that ESG will pay any savings shortfalls, in full, directly to the customer. Any shortfall will be reconciled annually by ESG in an amount equal to the shortfall as calculated by the annual energy audit and accepted by our customer and their designated facilities' representatives. **ESG does not share in any savings our project produces:** Our guarantee ensures that our customer will be the beneficiary of any excess savings. ESG’s primary objective with each of our customers is to meet and exceed customer expectations in all aspects of the performance guarantees — we typically exceed our guarantee performance level.

**Adjustments to the Guarantee:** The Guaranteed Savings will be adjusted to account for material changes, where the material is defined as any change or changes that may increase or decrease the energy consumption of the facilities by more than 1% annually, including, but not limited to the following:

- a. Changes in the hours of operation of any buildings constituting any part of the Facilities.
- b. Changes in the occupancy of the buildings constituting any part of the Facilities.
- c. Changes in the structure of buildings constituting any part of the Facilities, such as architectural features or building components.
- d. Modifications or renovations to the buildings constituting any part of the Facilities, which may or may not change the conditioned space.
- e. Changes to the ECMs.
- f. Changes in utility prices, rate structure or average unit cost values as Agreed upon.
- g. Change in utility suppliers or utility type(s)
- h. Change in the method of utility billing or purchasing with respect to the Facilities.
- i. Addition or deletion of energy consuming equipment at the site.
- j. Weather variance from base year to current year.
- k. CUSTOMER’s failure to adhere to operating and maintenance responsibilities as defined by the equipment manufacturer.
- l. Adjustments necessary to account for lighting burnouts as documented before retrofit.
- m. New outside air ventilation needed to bring any buildings constituting any part of the Facilities up to applicable code.
- n. Required increases in light levels to bring any buildings constituting any part of the Facilities up to applicable code or recommendations.
- o. Any condition, which affects the energy demand or consumption of Facilities, caused by CUSTOMER or its agents.

**Compliance with Customer Requirements:** ESG will work with LMT to define a customized approach for M&V that best reflects the goals of the township. ESG is comfortable working in partnership to customize an M&V process that is accurate, fair to both parties and also, helpful in maximizing savings results for the term of this performance contract. ESG guarantees all energy savings using the most appropriate methodology for accuracy and cost effectiveness. It is common for ESG guaranteed contracts to use multiple methodologies and data collection techniques to arrive at the best process for each facility.

**Adjustment for Excess Savings or Shortfalls:** All savings above the Project Guarantee Amount are entirely yours to keep! ESG will pay shortfalls on an annual basis. Each year’s annual savings must meet/exceed LMT’s debt service payments for that year. Any shortfall will be reconciled annually by ESG in an amount equal to the shortfall as calculated by the annual energy audit and accepted by customer representatives.
Regular Interval Post-Installation Verification: At regular intervals, ESG will verify that the installed equipment or systems have been properly maintained and are operating correctly. Although annual reports are required for establishing savings guarantees, reports should be prepared at least semi-annually. This ensures systems are working properly, allowing for fine-tuning of measures throughout the year based on operational feedback.

Ensuring Long-term Savings Results: A proper operations and maintenance (O&M) plan are very important to support long-term energy savings results. ESG is exceeding our guaranteed savings results at each of our projects due in part to the excellent job that our customers’ in-house facilities personnel are doing maintaining and operating key energy consuming systems. ESG is capable of providing consultative advice, as a minimum, or assuming total responsibility for HVAC operations and maintenance, or anything in between. ESG will work closely with the township to evaluate and determine the appropriate maintenance plan for all LMT’s critical equipment. Naturally, it will be LMT’s determination as to whether we include any maintenance or service agreement into the final project cash flow.

Guarantee/ Efficiency Analysis Services: In order to maintain and increase the savings results throughout the term, ESG provides the technical expertise to keep energy consumption to its absolute minimum. This requires ongoing monitoring and fine-tuning of all equipment, analysis of monthly energy costs, analysis of preventive maintenance strategies/ implementation and the ability to identify opportunities for further energy savings. ESG, with its staff of Certified Energy Managers and Analysts, will work together with the customer’s facilities staff to reduce the utility cost from the mechanical and electrical equipment in each building.

Utility Bill Monitoring: ESG will be accountable to input monthly utility data for each building as well as related weather data and adjustment factors. LMT will be accountable to ESG to provide the utility data to ESG on a timely basis upon receiving the bill from the utility. A system to simplify this process of ESG receiving the utility data from the customer will be developed.

ESG will then provide each customer with the following utility savings information:

- Monthly feedback to facilities staff; and,
- Quarterly feedback to administration

Formal reports to Customer: We typically provide annual guarantee reconciliation reports, but we can customize the frequency as needed.

Continuous Improvement: As part of this scope of services, ESG will constantly seek out the best ideas to further add value and effectiveness to our services and establish new levels of efficiency in the customer’s facilities! ESG will work with the township to customize an M&V program that is the most economical while providing the best results to validate actual energy savings.