



Response to

Guaranteed Energy Savings Program

August 8, 2017





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Response to Request for Proposals for Marshall County Fiscal Court



1. Executive Summary

Developing a *fiscally-responsible project for the future* is vitally important for Marshall County to continue to offer excellent amenities to the citizens, future residents, and the many visitors to the region, while retaining and attracting businesses that promote economic development. As the County seeks to enhance this foundation, identifying ways to reduce expenses and increase revenue is essential. Pursuing a guaranteed energy savings project with Energy Systems Group (ESG) is a significant step for Marshall County to accomplish these goals. As your partner, Energy Systems Group, a leading energy services provider in the Commonwealth of Kentucky and like no other energy services company, goes beyond revitalization to showcase your dedication to strengthening the community.

Throughout this response, we demonstrate how our core business practices directly correlate to the strategic priorities we heard staff and members of the Fiscal Court emphasize as important to you and as outlined on the county officials' profiles. ESG will focus on:

- **Providing financial transparency:** delivering an efficiency project on time, on budget, with no change orders;
- **Protecting taxpayer dollars:** providing accountability and keeping investment in the local community;
- **Enhancing environmental responsibility, safety and welfare of the county:** installing sustainable measures, guiding staff on critical decisions, and generating quantifiable energy savings; and
- **Delivering energy and operational excellence:** maximizing scope, addressing deferred maintenance, training staff and communicating with the county and its residents.



Marshall County Courthouse



Mike Miller Park

Investing in Marshall County – From the passion of the late Judge/Executive Mike Miller proclaiming Marshall County is *“the greatest community on God’s green earth,”* to the dedication of the Fiscal Court and Executive staff, it is obvious that the county is invested in improving the community and continues to take positive steps that will provide long-term benefits to its citizens and surrounding communities. By selecting ESG, you will have a company 100% committed to the same investment. To be invested, you have to be passionate, which is why ESG has been selected time and time again. This recurring selection is exemplified by our long history of repeat business in the Commonwealth of Kentucky. Many of our customers in

What better way to show a tangible result to Marshall County’s strategic priorities than to implement a guaranteed energy performance contract designed to enhance some of your most recognizable assets: your Courthouse, the judicial complex and Mike Miller Park. ESG believes that focusing on: 1) investing in Marshall County, 2) the safety and well-being of those using county facilities, and 3) achieving your goals of energy and operational excellence will ensure the success of the enhancements.



Marshall County Courthouse



Response to Request for Proposals for Marshall County Fiscal Court



the state have selected ESG for multiple phases. Furthermore, we have been successfully implementing projects in western Kentucky for more than 17 years, including working with many of the same team members identified for your project. They, like us, are personally invested in the long-term success of Marshall County. Our expansive history of top performance at KCTCS, Department of Corrections and area schools and counties, including McCracken County, exemplifies that success. The money the county invests in this project will benefit Marshall County two-fold: first by improving county facilities and infrastructure and second by purchasing materials from and employing local contractors.



The recent successful project at McCracken County resulted in significant savings and over \$3 million in improvements.

*"From site assessments, to scope development, through project implementation, their (ESG's) work has been virtually flawless. **ESG takes customer satisfaction seriously.***

The experience of working with ESG was uncommonly smooth and trouble free. No concerns, no surprises, and an overall enjoyable project and construction experience. I can highly recommend this company as a reputable and outstanding project partner!"

*Gurvant Shah
Capital Construction Branch Mgr.
Kentucky Department of Corrections*

Focusing on the safety and well-being of those using county facilities

– ESG brings a unique familiarity and knowledge of project work in secure facilities. Our prior ESPC projects in full-service jails, Sheriffs' offices, and state correctional facilities have positioned us to develop an outstanding project and construction management approach, based on

excellence in planning, coordination and communication. Utilizing corrections specialists when needed, to train subcontractors and coordinate with Jailers and Wardens, Deputies, Officers and maintenance staff in all aspects of safety and security standards and requirements has enabled us to minimize time, effort and resources as we perform our construction tasks.

Achieving your goals of energy and operational excellence

–Your staff mentioned several times the importance of addressing deferred maintenance. In previous meetings with county administration and personnel, we heard your pressures of operating and maintaining facilities with the hurdles of deferred maintenance and aging infrastructure. By working with ESG, you will be able to implement a successful project that will address your challenges and, at the same time, be able to make a positive impact to your operations.

ESG's Added Value – We understand that during these times of limited funding and aging infrastructure, counties are strapped trying to keep their facilities in peak operating condition. We are here to help you in the same way we have helped numerous

other counties address their issues. Our experienced team of industry experts utilizes our "template for excellence" process, which has delivered excellent results to all of our customers. The following summary is provided to you as an overview of how ESG is the partner of choice for Marshall County:



Marshall County Judicial Facility



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Best Fit – No ESCO is better suited for partnering with Marshall County than ESG. We are headquartered in the US and solely owned by a US utility. By design, Energy Systems Group is not a controls manufacturer, mechanical firm, or distributor. Rather, our core business is energy savings performance contracting. Marshall County will benefit from ESG's core focus, as it allows our team to provide unbiased solutions based on best value to the county.

As preferred in the RFP, ESG is NAESCO accredited as an Energy Services Provider, one of only a handful of companies with the proven and demonstrated expertise to be top in our industry and not merely a member. In our nearly 25-year history we have implemented over \$2 billion in projects nationwide. We are continually selected as the partner of choice over and over again leading to more than half of our customers, and many of our Kentucky customers, asking us to repeat our successes with them. As evidenced in our project reference section, we are intimately familiar with providing excellent energy efficiency projects with governmental entities throughout Kentucky.

We are an outstanding member of the Tennessee Valley Authority (TVA) Preferred Partners Network (PPN), completing 56 projects. PPN is an exclusive network of approved commercial and industrial trade allies who are experts in their field. Network members provide sound advice on energy solutions, install efficient energy equipment and guide participants through the process of applying for incentives throughout the TVA service area. Only PPN members are eligible to apply for custom rebates on your behalf.

Project Implementation – ESG brings a unique familiarity and knowledge in working with counties. Your Sr. Account Executive, Teresa Barton, served as a county official for many years and brings significant knowledge and experience with many of the approving and coordinating agencies which will streamline the process and assist with compliance with the following agencies:

- Administrative Office of the Courts – developing the memorandum of agreement to secure that the future revenue stream is steady for state-occupied facilities;
- Department for Local Government – debt reporting, compliance and grant assistance;
- Department for Energy Development and Independence – access to any sources of funding;
- Kentucky Association of Counties – should you select one of KACo's programs to finance your project;
- Department of Housing, Building and Construction – inspection and compliance; and
- Department of Corrections; Local Facilities -- compliance with Kentucky jail standards.

ESG's Strong Guarantee Structures and Financial Backing – ESG, a subsidiary of Vectren Corporation (NYSE:VVC), a publicly-traded utility with more than \$5.8 billion in assets, is financially sound and dependable. ESG's projects are bonded by Liberty Mutual Surety Co., the second largest surety in the industry, which offers ESG a bonding line of over \$500,000,000. All of ESG's project guarantees are first-party guarantees and the guarantee phase continues our partnership with Marshall County to ensure you are receiving the maximum benefit from the enhancements.

Customized Marketing Message – ESG will develop, with Marshall County's assistance, a specific message to keep those working and doing business at the county and judicial facilities informed, as well as communicate to the general public and employees. This messaging will allow citizens using the county buildings to better understand what important changes will be taking place, how your investment will affect the county, and inform facility occupants and general public. As with all of our projects, we will minimize disruption when in certain spaces by working hours when those spaces are unoccupied. However, we know detention facilities require a specific protocol for the safety and security of the employees, visitors, and inmates. We address safety in more detail in section B.2.3.E. ESG can incorporate these communications in the message as directed.



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Multiple Financing Options and Incorporation of Rebates – Marshall County will also have access to ESG's knowledge and experience of financing options and availability. One reason our customers choose us, and do so again and again, is our ability to assist customers to obtain financing on projects. We are not municipal financial advisors, and do not provide financial advice, but as part of our holistic approach, our in-house financial specialists will work closely with you to assist in identifying potential lenders, and requesting financial proposals from those lenders for your consideration. In addition, ESG continually researches ways to garner grant funds, rebates and incentives. We have staff dedicated specifically to obtaining any incentives or rebates. In the last five years alone, we have obtained more than 5.5 million dollars in rebates, grants and incentives in the TVA service area alone.

“Financing is not a profit center for ESG, rather it is a way for us to help our customers maximize the improvements and benefits of Performance Contracting.”

ESG's Local and Experienced Team - Like the County, ESG understands the importance of using experienced local contractors, vendors and engineering firms. Those who have a proven track record of implementing quality solutions are the best method to support local employment and offer the county locally available maintenance and service on the installed equipment. Using local contractors wherever possible is more cost effective and helps complete the circle of economy in the community by keeping as much work and money within the area.

Offering in-depth knowledge and experience in working with local governments, ESG's team of professionals understands the operational, fiscal demands, as well as the facility needs for counties and cities including jail operations. ESG has a record of accomplishments for local government customers including guaranteed energy savings projects in the following communities:

- McCracken County, Kentucky
- Boone County, Kentucky
- City of Covington, Kentucky
- Anderson County, Indiana
- City of Bloomington, Indiana
- Johnson City, Tennessee
- City of Anderson, Indiana
- Tipton County, Indiana
- Vanderburgh County, Indiana
- City of Evansville, Indiana
- Crawford County, Illinois
- City of Kingsport, Tennessee

In addition, ESG's provides to you our experienced team members from our Frankfort, Nashville and Evansville offices aligned as needed to support this project and the county.

ESG Strives to Find Every Dollar – Marshall County will benefit from our holistic approach and comprehensive audits which ensure every opportunity to reduce costs and increase efficiency are thoroughly examined. The county will select which measures to include in the final project. Being vendor neutral enables us to provide a product-independent set of solutions designed to meet the priorities and goals of the Marshall County Fiscal Court, not a set of solutions designed to sell our own products. We do not support other business divisions or have the pressure of incorporating their products at increased margins into our projects. We focus only on what is best for the Marshall County now and in the long term.

Outstanding Project Management Approach – Projects based on excellence in planning, coordination and communication have resulted in superior performance and results. In all steps of the project, Marshall County will receive thorough and consistent communication as to status and next steps. ESG will update the county regularly and hold progress meetings as scheduled.

Active Energy Management – Even the best-installed equipment and technology needs to be operated properly to hit savings benchmarks and continuously improve on results. This requires a comprehensive approach and plan





Response to Request for Proposals for Marshall County Fiscal Court



Active Energy Management – Even the best-installed equipment and technology needs to be operated properly to hit savings benchmarks and continuously improve on results. This requires a comprehensive approach and plan that incorporates control and utility sub-meter technology, and offers flexible inspection of results. ESG's "Active Energy Management" approach brings true excellence into focus. This action plan, as a living document and process, gives Marshall County the ability to sustain and grow exceptional energy savings results and positive benefits long-term.

Advanced Solutions to Achieve Marshall County's Goals

ESG is a full-service, single-source provider of energy efficiency and renewable energy projects. Our scope of services and expertise is broad and we have an unsurpassed experience in utilizing innovation to add value to our successful projects. Key elements of your recommended solutions coincide with what we believe to be the goals and objectives expressed to us through staff, internal observations, and from current local contractors that include:

- LED Lighting Retrofits and upgrades at select facilities
- Water conservation measures
- Ozone laundry system at the detention center
- Mechanical and HVAC system upgrades at detention center and select facilities
- Control systems at select facilities
- Building envelope, door seals, weather stripping and insulation at select facilities
- Wi-Fi thermostats for scheduling at Mike Miller Park
- Preventive Maintenance Program (software and tablets)



Marshall County Fiscal Court Preliminary Project Potential

The program that ESG recommends at this preliminary project stage produces between \$110,000 and \$115,000 in annual utility and operational savings for a project potential of \$1.8 to \$2.2 million for a 15-year term. We estimate utility rebates in the \$20,000 range as well. In developing the preliminary program, ESG addresses your goals and needs in a fiscally responsible manner that is truly beneficial to the citizens of Marshall County. As you know, the best projects are built in a collaborative manner with input from the Marshall County team and that will be our first step if selected.

The following RFP response elaborates on many of these findings, recommendations and discoveries and we are confident you will find us worthy, capable, and prepared, with a strong commitment to the success of Marshall County.

We would sincerely like to thank the Marshall County officials and staff for their commitment and support during development of this RFP response, particularly the efforts of Judge/Executive Kevin Neal, Deputy Judge Brad Warning, Jailer Roger Ford, County Treasurer Emily Martin, Mike Miller Park Director Dennis Foust, Maintenance Director Gary Teckenbrock, Jail Maintenance Technician, Roy Jones, and Commissioners Bob Gold, Johnny Bowlin, and Rick Cocke for their information and assistance. We appreciate the opportunity, are excited to work with Marshall County, and ask you to select us to be your energy services partner.

Sincerely,

Gregory F. Collins
President, Energy Systems Group



Response to Request for Proposals for
Marshall County Fiscal Court



2. General Information

2.1 General Information

Provide documentation as given below.

To: Marshall County Fiscal Court
Brad Warning, Deputy County Judge/Executive
1101 Main St.
Benton, KY 42025

Re: Response to the Request for Proposals for Energy Savings Performance Contracting

Date: August 8, 2017

FROM:

Firm Name: Energy Systems Group, LLC

Address: 4655 Rosebud Lane
Newburgh, IN 47630

General Phone Number: 812.471.5000

Contact Person (Name): Teresa Barton

Title: Senior Account Executive

Phone: 502.330.2331 **Fax:** 812.492.8354

E-Mail Address: tbarton@energysystemsgroup.com



Response to Request for Proposals for
Marshall County Fiscal Court



2.2 Company Profile

COMPANY must address all questions. If not applicable, enter N/A.

A. General Firm Information

Firm Name: Energy Systems Group, LLC

Mailing: 4655 Rosebud Lane, Newburgh, IN 47630

Address: 4655 Rosebud Lane, Newburgh, IN 47630

Physical Address: 4655 Rosebud Lane, Newburgh, IN 47630

Names, Titles and Phone Numbers of at least two principal contact persons:

1)	<u>Teresa Barton, Senior Account Executive</u>	<u>502.330.2331</u>
2)	<u>Ryan Baker, Project Manager</u>	<u>812-492-3765</u>
3)	<u>David Rehse, Regional Sales Manager</u>	<u>615-209-7172</u>

Submittal is for:

Name of Office: Energy Systems Group, LLC

Address: 1030 Burlington Lane, Frankfort, KY 40601 (physical address only)

Former Name(s) of Firm (if applicable):

Name: Energy Systems Group, Inc.

Address: 4655 Rosebud Lane, Newburgh, IN 47630

List any other wholly owned subsidiary, division or branch offices that will participate materially in the development of the project(s) in its evaluation process, and/or in the conduct of any services provided.

Name of Office: Nashville

Address: 555 Marriott Drive, Suite 150, Nashville, TN 37214



Response to Request for Proposals for
Marshall County Fiscal Court



B. Type of Firm

- ☐ Corporation
☐ Partnership
☐ Sole Proprietorship
☐ Joint Venture
☒ Limited Liability Corporation

C. Federal Employer Identification Number 35-2017952

D. Corporate Background

1. **Years under Present Name.** How many years has your firm been in business under its present business name? 20 (1997-2017) Years
2. **Former Names.** Indicate all other names by which your organization has been known and the length of time known by each name. Energy Systems Group, Inc. 3 Years (1994-1997)
3. **State Qualification.** Identify all states in which your firm is legally qualified to do business.
Energy Systems Group is legally qualified to do business in all states except: North Dakota, Oregon, and the District of Columbia (Washington D.C.). We are also licensed to do business in Puerto Rico and the US Virgin Islands.
4. **Lawsuit Involvement.** Has your firm been involved in a guaranteed savings or construction related lawsuit (other than labor or personnel litigation) during the past five (5) years?
_____ Yes X No

(NOTE: If this response is submitted by a branch office or division of a parent company, indicate the lawsuits involved directly by the specific branch or division.)

If yes, please explain in detail the nature of the claim, circumstances, amount in dispute, date suit was filed, and the outcome of the case.

5. **Construction Arbitration Involvement.** Has your firm been involved in any construction arbitration demands during the past five (5) years?
_____ Yes X No

If yes, identify the nature of the claim, amount in dispute, parties, and ultimate resolution of the proceeding.

6. **National Labor Relations Board or Similar Involvement.** Has your firm been involved in any lawsuits, administrative proceedings or hearings initiated by the National Labor Relations Board or a similar state or federal agency during the past five (5) years regarding your firm's safety practices?
_____ Yes X No

If yes, identify the nature of the claim and the ultimate resolution of the proceeding.



Response to Request for Proposals for
Marshall County Fiscal Court



7. **OSHA-Type Proceedings.** Has your firm been involved in any lawsuits, administrative proceedings or hearings initiated by the Occupational Safety and Health Administration or a similar state or federal agency during the past five (5) years regarding the safety of one of your firm's projects?

☒ Yes ☐ No

In 2016, a contractor on an ESG project hired by the subcontractor of ESG's subcontractor to perform specialized trenching work was cited for improper trenching and shoring design by the state's Occupational Safety and Health Administration (OSHA). OSHA issued citations to the sub-sub-sub-contractor. Despite the specialized nature of the work at issue and ESG's responsible delegation of work through its qualified subcontractor, OSHA also issued citations to ESG based upon a determination that ESG was a "controlling employer" under the state OSHA multi-employer worksite policy. ESG has and continues to deny that it bears direct responsibility for the specialized work performed by the sub-sub-sub-contractor and overseen by its sub-sub-contractor. As such, ESG is appealing the citation.

8. **Bankruptcy Involvement.** Has your firm or any of its parents or subsidiaries ever had a bankruptcy petition filed in its name, voluntarily or involuntarily?

☐ Yes ☒ No

If yes, explain in detail the circumstances, date the protection order was filed and the resolution of the case (or current status, if still ongoing).

- E. **Attachments.** List all attachments created to address additional information. List by number and heading in the Company Profile. If a computer-generated form is used, detailed descriptions can be included in the appropriate section rather than prepared as an attachment.

Item#

Heading Name

N/A

N/A



Response to Request for Proposals for
Marshall County Fiscal Court



F. Authorization

Dated at Newburgh, Indiana this 28th day of July, 2017.

Name of Organization: Energy Systems Group, LLC

By  Title President
Gregory F. Collins

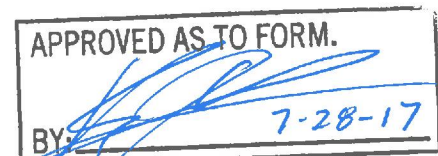
G. Notary Statement

Mr. Gregory F. Collins being duly sworn deposes and states that he is the President that answers to the foregoing Response to Marshall County Fiscal Court Request for Proposal for a Guaranteed Energy Savings Program by Energy Systems Group, LLC and that answers to the foregoing questions and all statements contained are true and correct.

Subscribed and sworn before me this 28th day of July, 2017.

Notary Public 

My Commission Expires October 4, 2022.





2.3. Company Qualifications and Approach to Project

A. General Qualifications

1. **Project History.** Briefly describe up to five (5) comprehensive facility planning services and/or energy savings performance contracting projects, which your firm has managed within the last three (3) years in Kentucky or contiguous states. Identify those project references involving buildings similar to the County's buildings.

NOTE: If this response is submitted by a branch office or division of a parent company, please provide project histories for those that have been managed directly by the specific branch or division. Projects that have been managed by individuals who will be specifically assigned to this project should also be included and identified.

Include the following information on each project:

- a. **Project Identification.** Name the project owner, state the type of project (generic building type such as hospital, school, etc.), and provide the location (city, state).
- b. **Project Dates.** Project actual construction start and end dates
- c. **Project Size.** Number of buildings and total square footage.
- d. **Project Dollar Amount.** Provide the total contract amount and the total project capital expenditure amount.
- e. **Source of Funds.** State the source of funds used for the project and your firm's role, if any, in securing those funds.
- f. **Contract Terms.** State the type of Contract (shared-savings, lease purchase, guaranteed savings), the duration of the contract term, and the financing arrangement.
- g. **Technical Design Personnel.** Include name(s) of primary technical design personnel.
- h. **Project Schedule.** Indicate if the project was completed on schedule. If not, please explain.
- i. **List of Improvements.** List of Facility Improvement Measures.
- j. **Projected Annual Savings.** State the projected annual savings.
- k. **Guaranteed Savings.** State the amount of the guarantee. Also describe how the guarantee functioned and if your firm was required to pay funds to meet the guarantee.
- l. **Comments.** Comment on any special features, services, conditions, etc.
- m. **References.** Provide the names and telephone numbers of the owner(s)' representatives that can supply references.

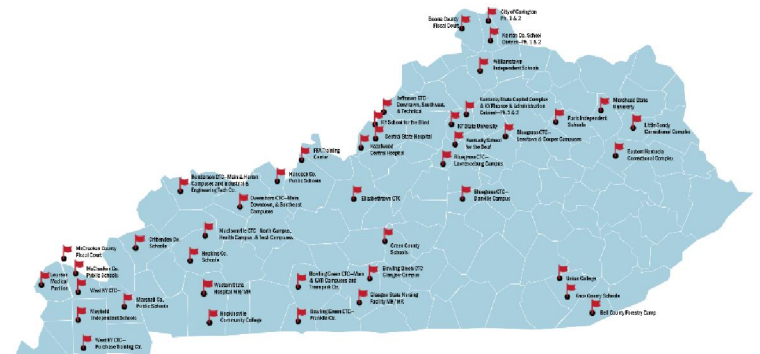


Response to Request for Proposals for Marshall County Fiscal Court



ESG has extensive experience providing innovative, self-funding solutions to a wide range of customers throughout Kentucky, the United States, Puerto Rico, and the U.S. Virgin Islands. Headquartered and founded in Southern Indiana, our portfolio of customers includes many Kentucky customers. We have been a leading ESCo partner in Kentucky since 1998, developing \$85+ Million in Kentucky facility and infrastructure upgrades through 44 projects including 12 KY ESPC projects with 7 multi-location projects and more than \$100 Million in guaranteed energy and operational savings.

The following list represents all energy performance contracts managed by ESG's Southeast Region over the past three years along with other key projects relevant to our ability to successfully provide Marshall County with the requested services.



ESG has implemented numerous projects for customers in the Commonwealth, resulting in over \$100 Million in energy and operational savings.

Kentucky

McCracken County Fiscal Court
Kentucky Community and Technical College System (Madisonville, Owensboro Paducah, KY)

Green County Schools
Paris Independent Schools
Kenton County Schools - Phase II

Commercial / Industrial

Metro Nashville Airport Authority, TN – Phase I
Metro Nashville Airport Authority, TN - Phase II
Summit Medical Center, TN

K-12 Education

Selma City Schools, AL
Rowan-Salisbury Schools, NC
Anderson County Schools, TN
Bradley County Schools, TN
Johnson City Schools, TN
Murfreesboro City Schools, TN
Trousdale City Schools, TN

Local Government

Peach County, GA
City of Johnson City, TN
City of Millington, TN
City of Murfreesboro, TN
City of Pickens, SC
City of Gulf Breeze, FL
City of Marathon, FL
City of Enterprise, AL
West Escambia Utility, AL
City of Harrison, AR
City of Inverness, FL
US Virgin Islands Dept. of Ed – Phases I & II

We have provided five (5) comprehensive projects similar in size and scope to Marshall County Fiscal Court that ESG has managed within the last three years. Individuals who will develop or manage these projects are included.



Response to Request for Proposals for Marshall County Fiscal Court



Reference 1

- a. **Project Identification:** McCracken County Fiscal Court
- b. **Project Dates:** Contract July 2016
- c. **Project Size:** 7 facilities encompassing 179,858 Sq. Ft.
- d. **Project Dollar Amount:** \$3,149,000
- e. **Source of Funds:** Debt Service and Administrative Office of the Courts. ESG assisted the Fiscal Court with an RFP to competitively select a lender.
- f. **Contract Terms:** Guaranteed Energy Savings Contract; 15-year financing
- g. **Technical Design Personnel:** Clay Herrin, Sr. Project Development Engineer, Craig Roberts, Project Development Engineer, and Ryan Baker, Project Management.
- h. **Project Schedule:** Project is anticipated to be on schedule. Final punch list is currently being reviewed (July 2017).
- i. **List of Improvements:**
 - Significant HVAC system upgrades at the Detention Center, Courthouse, Rescue Vehicle Garage, Road Department Garage and Emergency Operations Complex.
 - Hot Water Systems
 - Control Upgrades
 - Water Conservation Upgrades
 - Lighting Improvements
 - Envelope Improvements
 - Kitchen and Laundry Equipment Jail Upgrades
 - Other Measures include trash collection, fuel switch, meter consolidation.
- j. **Projected Annual Savings.** The annual projected energy savings guarantee is expected to exceed \$233,183.
- k. **Guaranteed Savings.** The annual energy savings guarantee is \$233,183. ESG has not paid funds to meet the guarantee.
- l. **Comments.** This was a comprehensive energy efficient facility improvement plans that revitalized and modernized the infrastructure at the McCracken County Government facilities.
- m. **References:** Doug Moore, Deputy County Judge/Executive; McCracken County Courthouse, 300 South 7th Street, Paducah, KY 42003; Phone: 270.816.2421 or Hon. Robert J "Bob" Leeper, County Judge/Executive, McCracken County Courthouse, 300 South 7th Street, Paducah, KY 42003, 270.444.4707





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Reference 2

- a. **Project Identification:** Kentucky Community & Technical College System: Madisonville, Owensboro, and Paducah – Phase IV
- b. **Project Dates:** 2016
- c. **Project Size:** 1,341,141 Sq. Ft. encompassing 35 buildings
- d. **Project Dollar Amount:** \$11,760,000
- e. **Source of Funds:** Lease Purchase through the State Master Lease program.
- f. **Contract Terms:** The Term was for 15 years
- g. **Technical Design Personnel:** Clay Herrin, Sr. Project Development Engineer, Rory Seagert, Sr. Project Development Engineer and Ryan Baker, Project Management.
- h. **Project Schedule:** The Project has been completed on time and within schedule.
- i. **List of Improvements:** All Colleges:

Lighting Systems Improvements, Utility Rate and Contract Modifications, Building Controls Upgrades, Vending Machine Controllers, Window Film, Door Seals and Joint Repair, Synchronous Belts on Air Handling Unit (AHU) Fans

Site Specific:

- Window Replacement (Madisonville)
- Water Conservation Measures (Madisonville / West KY)
- Germicidal UV-C Lighting on AHUs (Madisonville / Owensboro)
- Green IT—Power Savings Software (Madisonville / Owensboro)
- Retro-commissioning (Owensboro / West KY)
- Lighting Controls (West KY)
- Trash Service Modifications (West KY)
- Electrical Transformers (Owensboro)
- HVAC Improvements: Boiler Replacements and Fluid Cooler (Madisonville);
- Ductwork Improvements for Economizer, Reduced Chemical Water Treatment, Replaced Outside Air Dampers on Main AHU (Owensboro); Boiler and Chiller Replacements, Evaporcool Technology (West KY)

- j. **Projected Annual Savings:** The projected annual savings is anticipated to exceed
- k. **Guaranteed Savings:** The Guaranteed savings
- l. **Comments:** KCTCS awarded ESG our fourth contract to upgrade facilities at four separate colleges in order to increase their efficiency, enhance their facilities, and improve the overall learning environment for their students. In response to a specific need for ongoing energy management services, ESG developed a unique program tailored to meet the needs and objectives of KCTCS as a part of our overall energy services program.
- m. **References:** David Crowell, Director of Facilities Maintenance, 300 North Main Street, Versailles, KY 40383; 859.256.3100 x 2563244





Response to Request for Proposals for Marshall County Fiscal Court



Reference 3

- a. **Project Identification:** Kenton County School District – Phase II
- b. **Project Dates:** September 2013-July 2017
- c. **Project Size:** 20 facilities encompassing 1,927,786 Sq. Ft.
- d. **Project Dollar Amount:** \$3,905,000
- e. **Source of Funds:** Lease Purchase Agreement; Energy Efficiency Bonds
- f. **Contract Terms:** Guaranteed Energy Savings Contract; 20-year financing
- g. **Technical Design Personnel:** Rory Seagert, Sr. Project Development Engineer, Brent Roberts, Project Delivery Manager, David Rehse, Regional Sales Manager, and Ron Bresser, Project Management.
- h. **Project Schedule:** Project was completed ahead of schedule.
- i. **List of Improvements:**
 - Lighting Improvements (20 schools);
 - Window Film (19 schools);
 - UV-C Lighting (11 schools);
 - Mechanical Improvements (5 schools) including: provision of window air conditioning units, replacement of boilers with building automation system controls, installation of hot water heater improvements; retro-commissioning, air and water balance, mechanical system repairs, chemical free water treatment systems, sanitary pump station and force main sewer line, cooling tower make up water sewer credit meter.
- j. **Projected Annual Savings:** The annual energy savings was \$5,570,331.
- k. **Guaranteed Savings:** The annual energy savings guarantee is \$4,278,258. ESG has not paid funds to meet the guarantee.
- l. **Comments:** Kenton County School District has completed two separately competed and contracted phases of work with ESG in order to further increase their operational efficiency and meet their sustainability goals through a cost-effective, budget neutral process. Kenton County Schools has earned numerous awards for energy efficiency and energy education programs, both of which were supported through ESG's partnership with the school district. As an example, this district has earned the ENERGY STAR® Partner of the Year Award from the Department of Energy and currently has 12 ENERGY STAR® rated schools. These projects also yielded significant benefits from the local gas and electric utility provider, Duke Energy, through the award of utility rebates and incentives. ESG assisted the District with the applications for these funds as a value added service.
- m. **References:** Ms. Chris Baker, Energy Manager, 1055 Eaton Drive, Ft. Wright, KY 41017, 859-957-2659





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Reference 4

- a. **Project Identification:** Green County Schools
- b. **Project Dates:** September 2016-July 2017
- c. **Project Size:** 6 facilities encompassing 313,537 Sq. Ft.
- d. **Project Dollar Amount:** \$3,367,461
- e. **Source of Funds:** Lease Purchase Agreement; Energy Efficiency Bonds
- f. **Contract Terms:** Guaranteed Energy Savings Contract; 20-year financing
- g. **Technical Design Personnel:** Rory Seagert, Sr. Project Development Engineer, Craig Roberts, Project Development Engineer, and Ryan Baker, Project Management.
- h. **Project Schedule:** Project is on plan to be completed ahead of schedule
- i. **List of Improvements:**
 - Install new VRF heat recovery HVAC system with new outside air ventilation systems and MAU-that will serve the Middle School.
 - Install DDC controls with web Browser access for the high school, middle school (VRF Controls), and primary school.
 - Replacement of the high use toilets and other plumbing fixtures to reduce water consumption and sewer charges in all facilities including bus garage.
 - Installation of new LED lighting fixtures in the high school, middle school, intermediate school, primary school, board office and bus garage, including select exterior lighting. Installation of new door seals and repair joints between walls and roof, window frames, roof vent and overhead doors.
 - Installation of new ceiling tile in middle school gymnasium.
 - Destratification fans at high, middle and primary schools.
 - Exhaust vent replacement.
- j. **Projected Annual Savings:** The annual energy savings guarantee is expected to exceed \$150,000.
- k. **Guaranteed Savings:** The annual energy savings guarantee is \$146,408. ESG has not paid funds to meet the guarantee.
- l. **Comments:** This was a comprehensive energy efficient facility improvement plans that revitalized and modernized the school system and board office with a major mechanical upgrade to the middle school.
- m. **References:** Mr. Jim Frank, Superintendent, 402 East Hodgenville Ave., Greensburg, KY, 40383, (270) 932-6601





Response to Request for Proposals for Marshall County Fiscal Court



Reference 5

- a. **Project Identification:** Kentucky State Department of Corrections—Little Sandy Correctional Complex, Eastern Kentucky Correctional Complex and the Bell County Forestry Camp
- b. **Project Dates:** 2011-2103
- c. **Project Size:** This ESPC project provides a fully self-funding program which offers a cumulative project savings of \$15,816,492 over a period of 14 years.
- d. **Project Dollar Amount:** \$12,665,428
- e. **Source of Funds:** DOC used conventional financing for \$8,265,428. The balance of \$4,400,000 was financed using Kentucky Green Bank funds. Kentucky Green Bank funding is a revolving fund that is directly subsidized by the American Recovery and Reinvestment Act (ARRA).
- f. **Contract Terms:** 14 years
- g. **Technical Design Personnel:** Rory Seagert, Performance Engineer, Brent Robertson, Operations Manager, John Waddle, Project Manager, Ray Hinson, Business Development Manager
- h. **Project Schedule.** Project was completed on schedule
- i. **List of Improvements:**
 - Lighting System Improvements (BCFC, LSCC and EKCC) implemented various interior and exterior lighting technologies including T8 fluorescent lighting, electronic ballasts, compact fluorescent lamps and LED exit signs.
 - Water Conservation Improvements (LSCC and EKCC) Replaced and upgraded water closets, valves, faucets, and urinals. Installed meters for cooling towers and provided leak detection services.
 - De-stratification Equipment (LSCC and EKCC) Fans installed in high-bay locations to reduce heat losses and to supplement cooling systems.
 - Mechanical System Improvements (LSCC and EKCC) Installed chillers, boilers, domestic hot water heating equipment, air handling equipment, associated controls plus a natural pipeline.
- j. **Projected Annual Savings.** Total annual savings is \$1,129,749
- k. **Guaranteed Savings.** Total annual savings is \$1,129,749
- l. **Comments.** The majority of the project work at these secure facilities took place at the Eastern Kentucky Correctional Complex which includes providing infrastructure to convert the facility from coal as a fuel source to natural gas for its central heating systems. Other technologies utilized include lighting system upgrades, controls, water-efficiency upgrades, changes to electrical systems and mechanical systems improvements. The project included provisions for an owner's contingency and for services including equipment commissioning, training, training manuals, utility rate assessments, measurement and verification and support services.
- m. **References:** Gunvant Shah, Director of Facilities, KY Corrections Cabinet; Gunvant.shah@ky.gov; 502.564.2094





Response to Request for Proposals for Marshall County Fiscal Court



2. Personnel Information.

- a. **Full-Time Personnel.** Indicate the number of full-time personnel employed by your firm and the number available to work on this project.
- b. **Qualifications and Experience.** Identify who will have the primary responsibility for each task and phase of the project including technical analysis, engineering design, construction management, construction, training and post-contract monitoring. For each of the individuals listed, indicate the following: name, title, intended role and responsibilities for the duration of the contract, educational background, specific qualifications related to role and responsibilities, past relevant experience, number of years of relevant experience, supervisory responsibilities (if relevant to role), list of projects individual was associated with during the last three (3) years including type of project and project cost. Resumes may also be included as an attachment.
- c. **Areas of Expertise.** List all areas of expertise related to potential improvements in facilities. Include specialized areas of expertise in areas that might be relevant to the project. Also describe the professional and skilled trades that your firm customarily performs with employees.
- d. **Contract Negotiations Personnel and Legal Counsel.** Give the name and address of the person who will have primary responsibility for contract negotiations. Also identify your firm's legal counsel for this project.
- e. **Subcontractors.** Describe the nature of work generally conducted by subcontractors and discuss your flexibility in hiring subcontractors recommended by the Marshall County Fiscal Court or in selecting local subcontractors in The Marshall County Fiscal Court geographic area.

a. Full-Time Personnel

There are currently over 325+ full-time personnel employed by ESG. The Southeast Region serves the Commonwealth and is staffed by 39 employees, with 15 members of the Southeast Region available to work on this project. Additional resources are available from our corporate team.

b. Qualifications and Experience

ESG has assembled a well-qualified, dynamic team lead by individuals with direct experience in Corrections project work, to develop, implement, and monitor projects in any of your facilities. Our integration of the Operations and Sales Teams ensures that a quality project is delivered.

Customer satisfaction is the goal of every project at ESG. With that in mind, we set up a project team of professionals to work together throughout every project, large or small. Our Operations and Sales Teams form a cohesive partnership to ensure a quality project is delivered. These individuals work together from the concept stage through the final day of the guarantee period to ensure you are satisfied and that your objectives have been met.

The project team makes up a nucleus of the larger ESG team. While specific individuals are assigned to a project, any of the employees at ESG may, at one time or another, work on a job. As additional opportunities, competencies, and resources are required, ESG, together with our parent company (Vectren Corporation), is in a proactive position to assure that the requirements of a project will be met or exceeded.

Maintaining core competencies is critical to the overall success of an energy services agreement. We are committed to guaranteeing all of the operational and financial benefits the energy services agreement offers. Our primary competency is as an Energy Services Provider, not a manufacturer; therefore, we are committed to selecting the best products and services, which will over-perform on the requirements and goals set forth for this solicitation.



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Marshall County Fiscal Court



The following details the ESG team members that will either directly or indirectly be responsible for each aspect of providing Energy Performance Contracting Services for Marshall County Fiscal Court:

ESG President	Greg Collins
Sr. VP - Public Sector	Steve Pride
VP Corporate General Counsel	Dan Shell
Senior Counsel, Legal and Contracts	Kyle Rudolph
Director of External Project Finance	Ted Edgar
General Manager, Southeast Region	Scott Avirett
Regional Sales Manager	David Rehse, CEM, LEED AP
Senior Account Executive	Teresa Barton
Account Executive	Nick Atherton
Project Delivery Manager, Southeast Region	Brent Robertson, PE, CEM, CMVP, GBE
Sr. Project Manager	Ryan Baker
Engineering Manager, Southeast Region	Justin Forand, PE, CEM
Performance and Mechanical Engineers	Craig Roberts,
	Rory Seagert, CEM, CEA, CMVP,
	Jared Carlson, PE
Measurement and Verification Manager	Donna Wicks, CMVP, CRM



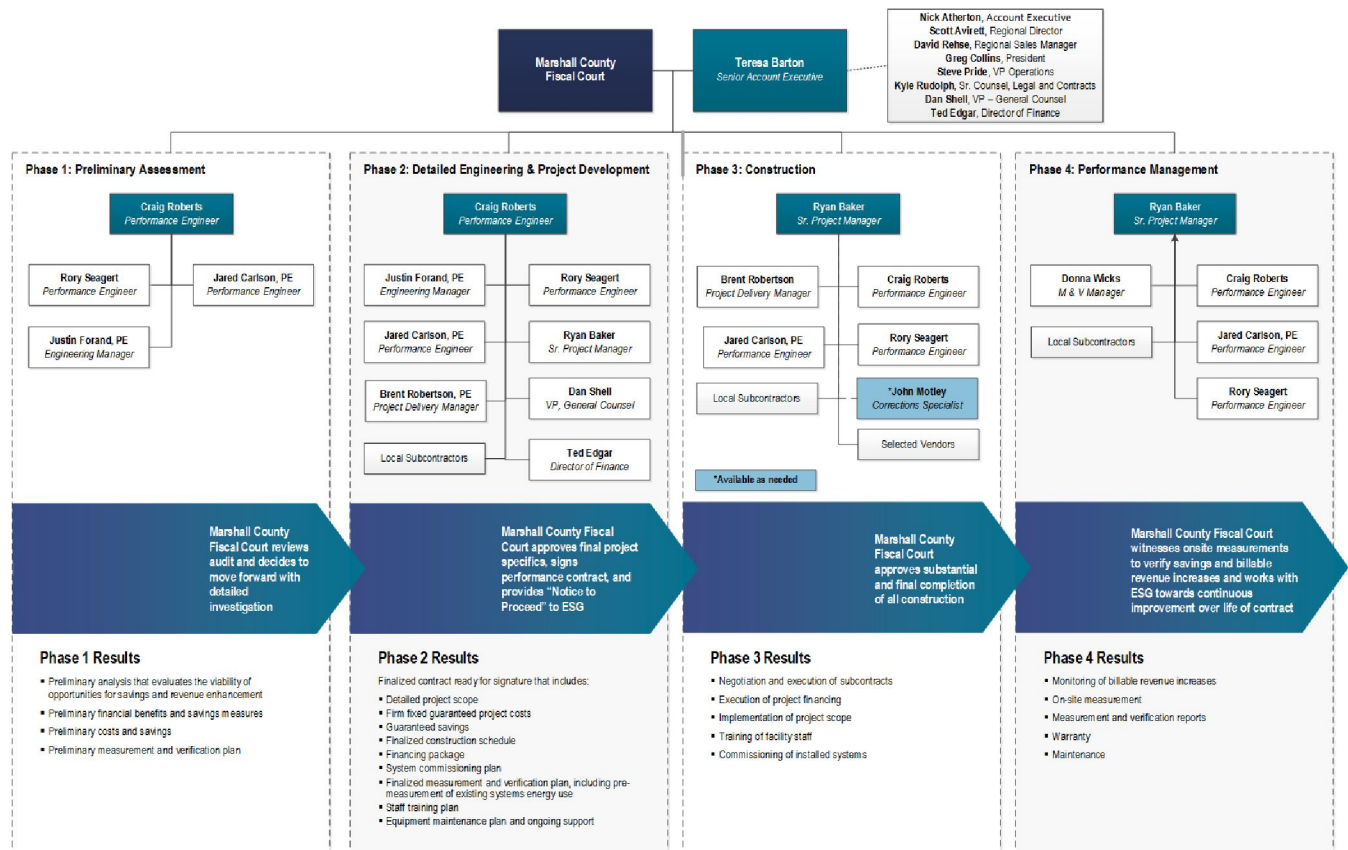
Response to Request for Proposals for Marshall County Fiscal Court



The following organizational chart details the ESG team members either directly or indirectly responsible for each aspect of this project. While these individuals are either specifically assigned to or available for this project, any of our employees may work on this job. Teresa Barton, the Senior Account Executive will be responsible for the entire partnership between Marshall County Fiscal Court and ESG, and will be the primary contact during the development and negotiation phases. During the installation, the Senior Project Manager, Ryan Baker, will be the primary contact. Our Engineers will interface with all team members throughout all phases of the project.

ESG Key Personnel Responsibilities and Experience

Organization chart, identifying all project staff members by project titles, and showing how each interacts with other staff members assigned to this project. Specifically include principal-in-charge, and project manager





Response to Request for Proposals for Marshall County Fiscal Court



Maintaining core competencies is critical to the overall success of an energy services agreement. ESG is committed to guaranteeing all of the operational and financial benefits, which the energy services agreement offers.

In the following résumés you will find information highlighting each key individual's name, title, intended role, and responsibilities/accountabilities, educational background, specific qualifications related to role and responsibilities, and past relevant experience.

Team Member Résumés

Account Representatives



Teresa Barton

Teresa Barton, Senior Account Executive

Education: AAS Accounting and a B.A. in Business Administration

Project Role: Teresa will serve as the Account Manager and key point of contact for Marshall County Fiscal Court. She will work with the Project Team to ensure the best solutions are identified to help the county increase efficiency, reduce operating and maintenance costs, and develop a holistic solution to improve comfort issues and other concerns that impact the community.

Experience: Teresa has over 25 years of executive and administrative experience with 18 years of supervisory experience and more than 22 years in state and local government. Teresa's experience includes preparing multi-million dollars governmental (state and local) budgets while serving in roles such as the Deputy Secretary and Executive Director for the Justice and Public Safety Cabinet, in Kentucky and as the Franklin County Judge/Executive for the Franklin County Fiscal Court. Teresa also has over nine years of sales experience in the energy services industry, providing over \$40 Million in facility and infrastructure upgrades for K-12, higher education, and state and local government ESPC contracts.



*Nick Atherton,
PMP, CEM*

Nick Atherton, Account Executive

Education: Classes in Architectural Studies and Computer Aided Drafting.

Project Role: Nick will assist in creating lines of communication between Marshall County Fiscal Court and the development and implementation teams. He will aid the construction team, legal team, senior management and technical representatives in achieving complete customer satisfaction.

Experience: Nick has been with ESG for 14 years. Nick's background includes experience in the engineering field, before coming to work directly with ESG as a Project Manager. He has extensive experience in Performance Contracting and energy services in several market segments including healthcare, education, and local government and brings over 19 years of leadership and program management to our industry. Nick is a Project Management Professional and Certified Energy Manager. He has attended classes in Architectural Studies at Vincennes University as well as Ivy Tech computer aided drafting classes.



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David Rehse

David Rehse, Regional Sales Manager

Education: B.S. in Mechanical Engineering and a Master of Business Administration

Project Role: David will serve as the liaison between the Account Manager and the Engineering Team to ensure close coordination and to verify that all project solutions allow you to reduce operating costs and improve your community.

Experience: David has over twenty years of energy related experience from which he has gained extensive business development and program implementation knowledge. He has developed client-specific solutions totaling over \$100 Million. Most recently, David partnered with the Metropolitan Nashville Airport Authority to develop multiple phases of infrastructure improvements, including the implementation of the largest geothermal lake plate system in the nation.



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Engineering



Craig Roberts

Craig Roberts, Energy Engineer

Education: B.S. in Mechanical Engineering

Project Role: Craig will serve as the lead technical resource and will assist with identifying and understanding the energy and operational inefficiencies affecting your county and developing a comprehensive, cost-effective technical solution that reduces the operational costs of Marshall County. Craig will be involved with the project from the design phase, through the installation, and for measurement services. Craig will ensure accuracy, quality, and cohesion of all technical and economical engineering decisions.

Experience: Craig is a Mechanical Engineering graduate. Craig has been a part of many successful projects since joining the ESG team. These projects have totaled over \$21 million in upgrades for various customers in the state of Kentucky such as; Green County Schools, Paris Independent Schools, McCracken County Fiscal Court, and Kentucky Community and Technical College System (KCTCS). Most recently, Craig has been a part of a team that has been developing a project for the city and schools in Oak Ridge, TN. This project is anticipated to be around \$8.8 million in upgrades.



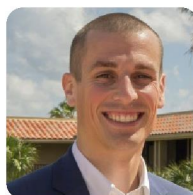
*Rory Seagert,
CEM, CMVP,
CEA, CBCP*

Rory Seagert, Performance Engineer

Education: B.S. in Mechanical Engineering

Project Role: Rory will serve as a technical resource. He will assist with identifying and understanding the energy and operational inefficiencies affecting your facilities and developing a comprehensive, cost-effective technical solution that reduces the operational costs of Marshall County Fiscal Court.

Experience: Rory has over 19 years of HVAC engineering and design experience. Rory has developed facility and infrastructure solutions projects for ESG customers, which have resulted in over \$100 Million in utility and operational savings. Most recently, Rory lead the engineering and design efforts on a nearly \$12 Million facility upgrade project for four colleges within the Kentucky Community and Technical College System (KCTCS). This project represents the fourth phase of work ESG has completed with KCTCS, demonstrating the quality of the design and implementation completed by Rory and other ESG team members.



*Jared Carlson,
P.E.*

KY PE #
32364

Jared Carlson, Performance Engineer

Education: B.S. in Mechanical Engineering

Project Role: Jared will serve as a technical. He will assist with identifying and understanding the energy and operational inefficiencies affecting your facilities and developing a comprehensive, cost-effective technical solution that reduces the operational costs of Marshall County Fiscal Court.

Experience: Jared has more than five years of technical and management experience and has worked extensively in the energy industry. Prior to joining ESG, Jared was a Manager of Energy Engineering for Sain Engineering Associates. There, he oversaw a team of more than 20 energy engineers and analysts. As an Energy Engineer he has performed and administered energy audits and commissioning on nearly 1,000 commercial buildings and provided economic analysis for energy conservation projects.



Response to Request for Proposals for Marshall County Fiscal Court



*Justin Forand,
P.E., LEED
Jefferson
Associate, CEM*

Justin Forand, P.E., Engineering Manager

Education: B.S. in Mechanical Engineering Technology

Project Role: Justin is ultimately responsible for the technical approach of the project. He will work closely with the Engineering Team, Account Manager, and Project Management Team to ensure that ESG identifies the best solutions to reduce your county's operating costs. Justin oversees the Engineering Team and coordinates all engineering resources to ensure quality engineering, accurate estimates, and the correct solutions to meet your objectives.

Experience: Justin has over 16 years of experience in building automation design and implementation, project management, energy engineering, and operations management. Recently, Justin participated on projects for Selma City Schools and the City of Enterprise, and the Kentucky Community and Technical College System.



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Project Management



*Ryan Baker,
CEM, PMP*

Ryan Baker, Senior Project Manager

Education: B.S. in Industrial Supervision

Project Role: Ryan oversees the implementation and construction of energy services projects and energy generation centers. His roles include managing project schedules, allocating resources, and working to identify, track, and resolve project issues. Ryan is responsible for relaying information to all stakeholders in a timely fashion.

Experience: Ryan has over six years of experience managing energy services projects. He has worked on contract negotiation and administered over technicians, engineers and energy management professionals and front line operators. He routinely ensures the successful and timely completion of project objectives.



*Brent Robertson,
P.E., CEM,
CMVP, GBE*

Brent Robertson, P.E., CEM, CMVP, GBE, Project Delivery Manager SE Region

Education: B.S. in Civil Engineering

Project Role: Brent works with the Engineering Manager as a team coordinator for a project and is ultimately responsible for the delivery of the project. He will work closely with the Project Management Team, the Engineering Team, and the Account Manager to ensure that ESG fulfills your objectives to reduce operating costs and enhance the learning environment. During the delivery of a project, Brent will oversee the Construction and Project Managers to ensure ESG provides quality installations, exceeds expectations, and immediately deals with all concerns in a timely and professional manner.

Experience: Brent has over nineteen years of engineering and project management experience. For the past eleven years, he has provided managerial oversight for ESG projects totaling over \$90 Million for a variety of customers.

KY PE #
24468



Response to Request for Proposals for Marshall County Fiscal Court



Measurement and Verification



*Donna Wicks,
CRM, CMVP*

Donna Wicks, Measurement & Verification Manager

Education: B.S. in HR Management; M.S. in Public Service Administration; Graduate Certificate in Sustainable Development Theory and Practice

Project Role: Donna will monitor the guarantee and provide reports for the county in a clear and concise format. Validating and ensuring results will directly impact the county's ability to manage operating expenses. As Manager of Measurement & Verification, Donna has the capability to determine what factors impact energy savings and calculate savings given changing parameters. Meeting your needs in auditing is a skill that should not go unmentioned. Some customers prefer baselines showing monthly deviations, while others prefer to see only savings based on initial verifications and measured equipment operation.

Experience: Donna has over seventeen years of experience analyzing, and reporting utility data and developing savings guarantee contracts for measurement and verification.



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Corporate Support



Ted Edgar

Ted Edgar, Director of Finance

Education: B.S. in Finance; M.S. in Public Service Administration

Project Role: Ted will work closely with the Account Manager and the county to help arrange financing on a project-specific basis.

Experience: Ted has over 30 years of finance experience including structuring and negotiating energy savings performance contracts. He routinely works with customers and their financial advisors and manages ESG's relationships with numerous national and regional lenders.



Dan Shell

Dan Shell, Vice President, Legal & Contracts

Education: B.S. in Marketing; Juris Doctor, with Distinction

Bar Admissions: Indiana and Tennessee

Project Role: Dan will ensure compliance and successful management of all legal affairs, contracts management, and environmental health and safety. Dan will lead key contract negotiations with the county. Dan also manages ESG's surety company relationship and bond portfolio.

Experience: Dan brings more than 26 years of comprehensive legal and leadership experience in providing practical solutions and guidance when managing risk and maintaining the highest levels of integrity.



Kyle Rudolph

Kyle Rudolph, Senior Counsel Legal & Contracts

Education: B.S. in Business Administration; Juris Doctor

Bar Admissions: Indiana and Kentucky

Project Role: Kyle works alongside clients to develop contracts and ensures that ESG upholds its contractual obligations on projects. He identifies new regulations and works to maintain ESG's compliance with all federal, state, and local regulations. Kyle works with Project Managers to guarantee that projects are up to code and that all personnel have filed the necessary paperwork.

Experience: Prior to ESG, Kyle's areas of practice included commercial and business litigation, insurance defense litigation, business and corporate law, internet law, and commercial and real estate transactions. Kyle has written many articles and secured numerous favorable verdicts. He has experience drafting successful motions and contract negotiations.

c. Areas of Expertise

Regionally and corporate-wide we are expanding our solid base of Local Government clients, thereby increasing the number and scope of our implemented measures along with our knowledge of how to bring the best solutions to local facilities. As a full-service Energy Services Company (ESCO), ESG has experience in all aspects of energy and water conservation measures and Operations & Maintenance (O&M) efficiency measures including means to address high demand charges. Our expertise ranges from lighting retrofits to HVAC upgrades and building automation systems, including steam plants and distribution systems, and design/build and operation of central energy plants, and everything in between.

The table on the following page displays the areas of expertise ESG is capable of providing.



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ECM EXPERTISE	STUDIES		DESIGN	
	In-House	Subcontracted	In-House	Subcontracted
Lighting	X	X	X	X
Electrical				
Medium Voltage Distribution up to 69 kV		X		X
Building Electrical Systems		X		X
Power Factor Correction	X	X	X	X
Demand Limiting	X		X	
Security and Fire Detection		X		X
HVAC				
Energy Management Systems	X	X	X	X
Chillers	X		X	
Geothermal Systems	X	X	X	X
Steam Heating	X		X	
Heat Pumps	X		X	
Heat Recovery	X		X	
VFDs and VAVs	X		X	
Ground Coupled Heat Pump (GCHP) Systems	X	X	X	X
Hot Water Heating	X		X	
Central Plants / Energy Centers				
Central Chiller Plants	X		X	
Cogeneration	X		X	
Coal Fired/Stoker Fired	X		X	
Gas/Oil Fired	X		X	
Steam to Hot Water Conversions	X		X	
Package Boilers	X		X	
Water Conservation				
Toilet/Shower Replacements	X	X	X	X
Laundry Equipment Upgrades	X	X	X	X
Pool Equipment Improvements	X	X	X	X
Sewer Credits	X		X	
Fire Protection	X	X	X	X
Kitchen Equipment Replacement	X	X	X	X
Water Treatment		X		X
Sewage Treatment		X		X
Sewage Collection		X		X
Building Envelope				
Windows	X	X	X	X
Roofing	X	X	X	X
Telecommunications		X		X
Solid Waste Management	X	X	X	X
Various "Green Power" ECMs (Renewables)				
Biomass, Alternate Fuels, Thermal Storage	X		X	



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d. Contract Negotiations and Legal Counsel

We generally use an ESPC opportunity-specific contract negotiating team. In this instance the team will be made up of the following individuals:

- Greg Collins, President
- Dan Shell, VP Corporate General Counsel
- Steve Pride, VP Operations
- Teresa Barton, Senior Account Executive

We have all the appropriate personnel and levels of responsibility represented to cover all aspects of the contract and to address fully the terms and conditions.



Leading our contract negotiating team is:

Kyle Rudolph, Senior Counsel, Legal and Contracts
Energy Systems Group
4655 Rosebud Lane
Newburgh, IN 47630

ESG's legal counsel is:

Dan Shell, VP Corporate General Counsel
Energy Systems Group
4655 Rosebud Lane
Newburgh, IN 47630
(812) 492-3722

e. Subcontractors

The nature of work performed by our subcontractors for the most part relates to the mechanical, electrical, and plumbing installation tasks. From time to time other aspects of projects (including specialty engineering and design functions) may be handled by subcontractors under the close supervision of ESG staff. ESG works with numerous subcontractors, union or nonunion, based on the local preference and at the client's request. We promote utilizing local subcontractors whenever possible and all aspects of the project are handled directly through ESG. ESG works directly with the subcontractors to insure a seamless process. We are flexible with respect to this process as long as selected subcontractors bring direct work experience applicable to your facilities and certain important criteria are met. Beyond safety record, financial stability, and experience, we have two main requirements of all of our subcontractors: They must be preapproved by Marshall County to perform work in your facilities, and they must demonstrate (contractually) to ESG that they can perform quality work within the schedule required and at a fair price.

We are flexible hiring subcontractors recommended by Marshall County and those located geographically favorably to your facilities, it is our policy and practice to do so. In the subcontractor selection process, we first turn to Marshall County's preference. If no preferences exist, then we seek local contractors with the experience and capabilities required. Only on occasions when unique expertise is needed will we go beyond the local subcontractor pool of resources. Having implemented multiple ESPC projects throughout the region and Commonwealth, ESG has developed a strong and extensive network of subcontractors who deliver outstanding results. We will cross check our list of recommended subcontractors with those subcontractor preferences expressed by Marshall County's to make joint decisions on the best subcontractor selections.



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While the statute doesn't require a competitive bid process in determining the final selection, we use best business practices of soliciting quotes to protect the customer and recommend choices based on overall value as opposed to low bid.

We have had preliminary discussions with many reliable subcontractors, engineering firms, and LED lighting manufacturers concerning this project potential and can say with total assurance we will be able to assemble all necessary resources to meet the requirements for project work at Marshall County. If we are selected to serve Marshall County Fiscal Court, we again will demonstrate our ability to conduct multisite, geographically spaced, concurrent work as we have successfully demonstrated in the past.

Network of Subcontractors and Project Partners

ESG, over the many years and number of projects we have performed for our west Kentucky-based Customers, has developed an extensive network of subcontractors and project partners. Having performed work in local government and detention facilities. We will be pleased to share our references on such subs and partners.

With the security concerns, focus on safety, need to minimize disruption of core mission, and to keep dependence on Security Officers and other detention center staff to a minimum, experience in corrections work carries great value to the Marshall County Fiscal Court.

Working in western Kentucky, ESG has a long list of project partners that we will bring to the Marshall County Fiscal Court for consideration. Below are many of the firms we have worked with, have discussed specific aspects of a potential project or have offices and resources in the area.

- CMI
- Penn & Sons
- DC Electric
- Thermal Equipment Sales
- ICI Mechanical
- Marcum Engineering
- Automated Building Concepts
- C&C Heating & Air





2.3. Company Qualifications and Approach to Project

B. General Approach

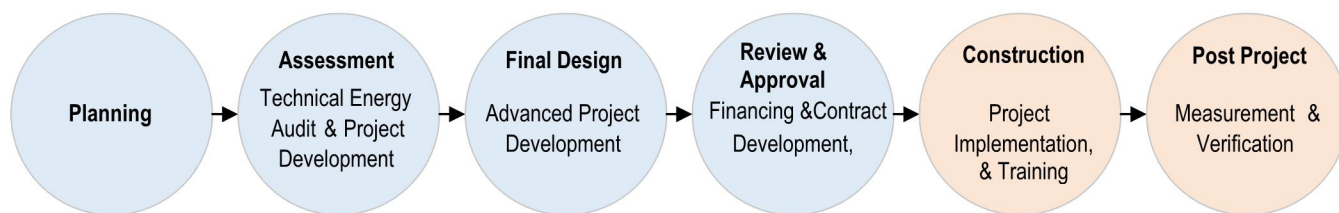
1. Project Services - Summarize the scope of services (assessment, design, construction, monitoring, operations, maintenance, training, funding, etc.) that would be offered for this project.
 2. Project Management. Include a brief description (not to exceed 5 pages) of your firm's approach to project management and the specific benefits your firm can offer The Marshall County Fiscal Court.
 3. Engineering Design. Describe your firm's approach to the technical design of this project.
 4. Training Provisions. Describe your firm's capabilities in providing technical training for the Marshall County Fiscal Court facility personnel. Describe your firm's involvement in developing training manuals for facility staff.
 5. Monitoring and Verification. Describe the company's approach to monitoring and savings verification of each recommended project's performance, including the frequency of such efforts. Note if an industry standard such as the *International Monitoring and Verification Protocol* is preferred by the company.
 6. Savings Calculations. List typical procedures, formulas and methodologies including special metering or equipment your firm may use to calculate utility and O&M savings. Include typical assumptions made in the calculations.
 7. Dollar Savings Calculations. Describe the procedure to assign dollar values to the O&M and utility savings.
 8. Maintenance Contracts. Describe the types of equipment maintenance or monitoring services that may be included. Comment on whether The Marshall County Fiscal Court maintenance staff can perform some of these duties if desired, and describe any impact on the guarantee. (These duties could include programming and maintaining the control system, installing lighting retrofits, maintaining HVAC equipment, etc.). Describe the required length of the maintenance contract and the relationship with the guarantee in the event that The Marshall County Fiscal Court chooses to terminate the maintenance contract prior to the end of the energy services agreement.
 9. Billing and Invoices. Describe your standard billing procedures and attach a sample invoice.
 10. Provision of Funding. Briefly describe the types of funding arrangements provided by your firm for past projects. Include a brief description of the source of funds and the potential dollar amounts currently available to your firm to finance these types of projects. Indicate what representative interest rates may be available, financing terms and other variable economic factors associated with each method. Please comment on how you would work with The Marshall County Fiscal Court to utilize tax-exempt financing or other methods to keep financing costs at a minimum.
 11. Provision of Insurance. Describe level and types of all insurance policies applicable to an ESPC project.
 12. Provide proof of accreditation in good standing with the National Association of Energy Service Companies (NAESCO).
-
1. Project Services - Summarize the scope of services (assessment, design, construction, monitoring, operations, maintenance, training, funding, etc.) that would be offered for this project.

Assessment

In line with the service offerings provided to our Energy Savings Performance Contracting (ESPC) Customers, ESG is a full-service ESCo and offers a broad range of services including assessment, design, construction, monitoring, operations, maintenance, training, financing, etc. We will use our process for public buildings and secure facilities at Marshall County as discussed on the following pages:



Response to Request for Proposals for Marshall County Fiscal Court



Assessment (Technical Requirements)

a. Technical Audit. Our proposed contract terms will include the performance and presentation of results from a detailed technical audit of acceptable quality to Marshall County. The minimum annual energy, water, and O&M cost savings and financing period will be reviewed and negotiated. The technical audit will include estimates of savings for each measure. Also, each measure will include an estimate of all costs including design, engineering, installation, maintenance, repairs, and debt service.

b. Standards of Comfort. Specific standards of comfort will be stated in the Contract Documents and shall meet minimum established industry standards. ESG will be responsible for maintaining the levels of comfort for each building as specified in the RFP or in any final agreement. Persistent failure to maintain the defined climate and lighting conditions will constitute a default.

c. Professional Engineer Involvement. A registered professional engineer will supervise, review, and approve design work done under this contract. The engineer will be an ESG employee and will be registered in the State of Kentucky.

d. Guaranteed Savings. ESG will comply with Marshall County Fiscal Court's requirement of a minimum annual guaranteed level of combined savings and improved performance approach to the project. If the project does not generate the guaranteed level of savings in any given year, ESG will be responsible for reimbursing Marshall County the amount of the shortfall necessary to pay for annual project financing and all related contract obligations. Excess savings will not be used to reimburse ESG for any payments made due to shortfalls in other years. Improvements and services must result in guaranteed minimum annual energy and water savings options, as well as guaranteed minimum levels of occupant comfort and operations and maintenance and/or any ancillary services. A guarantee is required to equal or exceed the calculated and agreed-to savings attributable to all energy saving measures for each year during the contract period. The combined savings achieved by the installed projects must be sufficient to cover all project costs, including debt service and contractor fees maintenance, monitoring, and other services for the duration of the contract term. Annual savings will be verified at a specified time each year in order to determine if our guarantee needs to be exercised.

e. Construction Management. ESG will work with current building management and maintenance personnel to coordinate construction and provide appropriate training in operations and maintenance of all installed improvements. No equipment or other improvements will be installed that would require Marshall County to hire additional personnel unless contract negotiations produce an explicit exemption for a specific installation. Maintenance responsibilities shall be proposed in detail in the contract.

ESG now uses Procore construction management software to enhance our abilities to manage, streamline, document and share information across our team and with our customers.

f. Equipment Standardization. All equipment installed that is comparable to similar equipment at other sites operated by Marshall County shall be of the same manufacturer for standardization of equipment, unless accepted by Marshall County.

g. Maintenance Manuals. At least three sets of operation and maintenance manuals for each site will be provided for all equipment replacements and/or upgrades at each location. Manuals are subject to approval by Marshall County. Upon completion of the contract, ESG shall provide Marshall County a single comprehensive schedule of necessary preventive maintenance for all installations for the five years following contract closeout.



h. As-Built Drawings. Where applicable, ESG will provide Mylar and disk, reproducible "as built" and record drawings (or such electronic equivalents as may be agreed to with Marshall County) of all existing and modified conditions associated with the project, conforming to typical engineering standards. These should include architectural, mechanical, electrical (including detailed wire diagrams), structural, and control drawings and operating manuals within 30 days of completion of installation.

i. Follow-up Monitoring and Maintenance Services. Following the installation and implementation of improvements, ESG will be responsible for maintaining and monitoring the measures to ensure optimal performance; however, Marshall County has the option to decline these services or negotiate for a reduced term of services.

Assessment (Owner Requirements)

a. Owner Inspection. Marshall County will have the right to inspect, test and approve the work conducted in the facilities during construction and operation. Marshall County will have the right and access to the account books, records, and other compilations of data that pertain to the performance of the provisions and requirements of this agreement. If the contract negotiations call for cost-plus or open-book pricing, then the accounting books of ESG must be accessible by Marshall County. Records will be kept on a generally recognized accounting basis, and calculations will be kept on file in legible form and retained for three years after closeout. Marshall County retains the right to have its representative visit the site during the audit and implementation phases of the project, and to attend relevant on-site or off-site meetings of ESG and/or its subcontractors.

b. Final Approval of Owner. Marshall County retains final approval over the scope of work and all end-use conditions. Marshall County shall not be liable to make payment to the ESCO for any work performed, unless such work was approved by Marshall County.

c. Property of Drawings, Reports and Materials. All drawings, reports, and materials prepared by ESG specifically in performance of the contract shall become the property of Marshall County and will be delivered to Marshall County as needed or upon completion of construction. The format for these will be determined by the Division of Engineering and Contract Administration.

d. Compliance. All work completed under the contract will be in compliance with all applicable federal, state, and local laws; rules; and regulations such as building codes and appropriate accreditation certification and licensing standards. Work will be in accordance with sound engineering and safety practices and in compliance with all Marshall County regulations relative to the premises. ESG and its subcontractors will be responsible for obtaining any and all required governmental permits, consents and authorizations, and for payment of any and all state and city required taxes and fees which result from the contract.

e. Handling of Hazardous Materials. All work completed under the contract must be in compliance with all applicable federal, state and local laws, rules and regulations regarding waste disposal and treatment/disposal of any hazardous material that could result from the project. Work must also be in accordance with sound engineering and safety practices and in compliance with all reasonable Marshall County rules relative to the premises. All costs associated with removal of hazardous material, as identified as part of the project, will be the responsibility of ESG and shall be included in the total project cost. Ownership of all hazardous materials shall remain with Marshall County. Coordination for all hazardous materials removal will be through the designated individual representing the Division of Engineering and Contract Administration. Removal of all refrigerant shall be included where applicable.

f. Subcontractor Approval. Marshall County retains the right to approve any ESG selected subcontractor prior to its commencement of work on this project. ESG will work with you to determine local subcontractors where possible.

g. Applicability of O&M savings. Any O&M cost savings related to maintenance and operation of the facilities will be rigorously reviewed and, if agreed to, will be limited to those that can be thoroughly documented and approved by Marshall County.



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h. Capital Cost Avoidance Funds. Funds may be available from the Marshall County Fiscal Court to enhance the financial feasibility of the project. If specific funds are known to exist, they will be identified in the RFP. Funds may be identified from maintenance or operating accounts after the specific scope for this project is identified.

i. Contract Term. The contract may be subject to annual appropriations. The duration of the contract will be mutually determined between ESG and Marshall County based on financial factors so that a zero or positive net cash flow is realized by Marshall County.

Approach to Management

One of the elements of our successful approach to management is the application of creative and innovative thinking early in the process. This approach helps us identify a range of typical and “out-of-the-box” solutions designed to optimize the project scope. Our solutions represent the best value and benefit to Marshall County Fiscal Court and provide the greatest positive impact for your facilities.

We value your involvement throughout this process. While we are ultimately and solely responsible for the performance guarantees associated with our ESPC program, our approach to developing the program requires input from your staff to ensure we are meeting your project goals and objectives and to coordinate project activities through the least disruptive manner.

We perform our work in a comprehensive and complete manner throughout each phase of the project. We follow documented processes and procedures that were developed based on best practices. Our team is committed to following this approach during all activities from research and data collection required for opportunity assessment, evaluating technology selection, to ensuring successful equipment installation and system startup. Our program success is dependent on following a comprehensive approach in the performance of each of our project functions.

Each step of the process of assessing and developing project opportunities must be well organized and structured. From the initial project kick-off meeting, to the coordination and management of our subcontractor partners, to the development of punch lists following installation and start-up, and through the measurement and verification stage, organization and structure typify our approach. A well-defined process and explicitly defined procedures are the outgrowth of ESG’s Best Practices, and these have been institutionalized in all our projects.

We are committed to success measured in terms of customer satisfaction in all our projects whether or not they are based on a performance guarantee. The best measure of success comes from projects completed on time and within budget that meet or exceed the performance objectives. Customer satisfaction is engrained in our day-to-day activities and is a key aspect of our corporate culture. Our team is empowered to make decisions and contributions to successfully provide solutions that meet your objectives.

Specific Benefits

While there are a number of important benefits that Marshall County Fiscal Court can realize from awarding a contract to ESG, one of the most significant is the partnership itself. We strive to establish a very close and mutually beneficial relationship with our customers. Our past projects have afforded us this opportunity and we have a strong desire to continue and build on that partnership. We focus on customer needs and apply the solutions that bring the direct project implementation benefits sought.

Our objectivity and unbiased view towards equipment and system selection results in the most effective and greatest value in technology and implemented measures. We offer the benefits of the broadest possible range of energy, water, utility, “green power,” and alternative fuel solutions.



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Our training programs are comprehensive and are based on an effective needs assessment, which is used to design and customize your program. We provide expertise on utility tariff and rate analysis and pride ourselves in, and consistently demonstrate, excellence in engineering. We are committed to environmental stewardship and demand environmentally sound practices on the part of our subcontractors as well. We go beyond traditional improvements and work with you to leverage energy savings to provide other beneficial, non-energy facility improvements whenever possible.

2. Project Management. Include a brief description (not to exceed 5 pages) of your firm's approach to project management and the specific benefits your firm can offer The Marshall County Fiscal Court.

ESG's commitment to 100% Customer Satisfaction is one that is taken seriously. ESG realizes that anyone can sell you their idea or their product, but what can really separate competing companies is how they deliver their product. That is where Project Managers play a vital role in our Customer Satisfaction. Project Managers have direct day-to-day communication with the owner's staff, the onsite contractors, and the suppliers who provide the materials to the subcontractors. A Project Manager's main function is to orchestrate the various parties, in unison, to ensure smooth delivery of a high quality project and 100% Customer Satisfaction. This orchestration requires a rare combination of skills and will. It is an unrelenting pursuit of excellence, coupled with outstanding communication skills and the ability to motivate the team that sets apart the best Project Managers. The goal of ESG's standard procedures is to provide the framework for our Project Managers to manage three key components that are critical in every project. They are **Time**, **Quality**, and **Cost**.

Time is an important component in any project. Project Managers are a key factor to driving progress and identifying the critical path of all deliverables. Project Managers are engaged early in the development of an opportunity. Project Managers offer insights into constructability and how best to approach any given project and the associated scheduling challenges. When the project moves to the audit stage, subcontractors are brought in and given a scope of work and timeline to prepare the proposal to best match up with the project requirements. Upon project implementation, the Project Manager will develop a detailed project schedule and get full buy-in from the entire team of owner's representatives, subcontractors, engineers, and suppliers. During construction, project schedules are reviewed at every progress meeting and updated by the Project Manager as construction progresses. At each project meeting, progress is discussed as well as future milestones and work. Detailed coordination and communication takes place in this format and allows for conflicts to be resolved quickly or avoided all together. If delays occur during the course of construction, it is the Project Manager's responsibility to actively mitigate these delays by working with the team to come up with the best solution to get back on track. Proper communication can resolve, and in many cases, avoid schedule conflicts before they become an issue.

ESG – Local Project Manager

The proximity of ESG's Project Manager means he can be on-site in a timely manner as required.

Quality control is a cradle to grave proposition. ESG views quality control as a vital component to both our Customer and as an organization for a successful future and as such, has developed a detailed Quality Assurance/Quality Control (QA/QC) program as part of our Project Management processes. ESG goes through a detailed pre-qualification process with all of our subcontractors prior to a contractual commitment with them. Each contractor is re-evaluated every two years and project performance is evaluated at the end of each project to determine if the subcontractor is qualified to remain as an ESG pre-qualified vendor and to ensure continuous improvement in their delivery. In addition to our rigorous pre-qualification process, onsite evaluations are performed by the Project Manager through our QA/QC program. The first step involves a detailed pre-construction meeting to review with all parties the exact requirements of the work including submittals, site logistics, design requirements, permits required, testing, and safety considerations. The second step takes place shortly after the work has begun. This step is an initial meeting by the same parties that attended the pre-construction meeting. This meeting is to



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ensure that the work discussed in the pre-construction meeting is being installed as planned and in accordance with the contract documents. This meeting discusses procedure compliance, inspection of preliminary work, workmanship, and includes a safety check. All deviations are documented and addressed immediately. As an ongoing part of ESG's, QA/QC program Project Managers are required to review and document Quality Control inspections weekly on their Project Manager's weekly report. Deficiencies are written up and sent to the appropriate subcontractor and tracked until the deficiency is resolved. ESG engineers also do on-site inspections periodically and evaluate quality as well as progress. ESG views quality control as vital to our future success. We view every project and relationship as a partnership that will last for years to come. We monitor and remain engaged in every project we complete throughout the guarantee. It is in our best interest and the interest of our Marshall County Fiscal Court to ensure the highest quality is delivered and that systems installed operate efficiently and as designed for the life of the systems.

Cost control is at the forefront of Marshall County Fiscal Court's minds. ESG's pledge to Marshall County in our **"No Change Order Contract"** is that ESG will not ask for a change order for the performance of the work as defined in our scope of work. To clarify, ESG pledges to provide a complete and operational system that meets the design intent and performs as promised. If the project requires additional scope in order for ESG to meet its guarantee, the Marshall County will not see a change order for this added scope. With that said, the real cost control to Marshall County is in our detailed work up front in defining our project and laying out detailed scopes of work for our subcontractors. This assures we are getting the best price, with the best quality, which fits into our defined schedule to end up with the best possible value for you. Project Managers assist the engineers in defining project scope and in making sure we get the best value. Scope clarity ensures the best possible pricing as it is often uncertainty and risk that drives contractors pricing upward. ESG will solicit proposals from our trusted contractors as well as your trusted contractors to ensure the best value for Marshall County. Upon receipt of subcontractors and vendor quotes, the Engineer, as well as the Project Manager, will conduct a thorough analysis that incorporates price, scope completeness, quality, schedule and our experiences with the contractor or supplier.

PROJECT MANAGEMENT PROCEDURES

Well-defined, project-specific processes and procedures are key to a well-managed project. ESG has developed a Delivery Manual that defines our blueprint for the procedures that ESG has adopted as a core value. These processes are customized, as the ESG team sees fit, to fully meet your unique delivery requirements and standards. This bend-but-don't-break flexibility allows ESG to maintain the high level of quality and Customer Satisfaction that is at our core, while customizing our approach enough that all Marshall County's standards and stated goals are met or exceeded.

ESG's project management team is available 24 hours per day, 7 days per week to meet any and all construction requirements. A very important aspect of the project management process is the ability to meet project deadlines. In order to ensure these deadlines are met, our Project Manager structures the process into clear-cut phases to achieve the end result. Those phases are as follows:

*ESG's Project Management
Team is available 24/7*

I - PLANNING PHASE

The Planning Phase takes place in parallel with steps in the Scope Development Process. The Project Manager (PM) shall work in conjunction with the Lead Engineer. Many steps take place prior to finalizing the contract that requires the participation and skills of the PM. The following shall be performed:



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- Accompany engineers on walk-throughs during the audit phase at the Customer's facility.
- Assist in the bidder subcontractor selection process which will be performed to determine which subcontractors should be asked to bid the project work scope. The selection of these vendors is the result of collaborating with the Customer's staff.
- Develop a preliminary project schedule for the defined work scope. A Microsoft Project software tool will be utilized to develop a detailed Schedule of Events that will illustrate the scheduling and planning of each work item within the project scope.
- Review the scoping documents prior to the subcontractor walk-throughs.
- Develop the final project schedule during the proposal development phase to determine how work will be performed at the Customer's site buildings.
- Participate in the formal risk review during the contract development phase.
- Review the detailed M&V plan with the Lead Engineer.
- Participate in the final proposal presentation to the Customer's representatives.

*Early Project Manager
Involvement is critical for
optimum scheduling and
implementation.*

II – PRE-CONSTRUCTION PHASE

The Pre-Construction Phase takes place prior to actual field construction at the Customer's buildings. The following steps will be performed:

- Review performance criteria and project definition with subcontractors who have been selected to perform work at the Customer's site buildings.
- Document agreements with subcontractors on bid clarification form.
- Execute subcontracts.
- Coordinate pre-purchase of long-lead items.
- Assemble the Customer project file.
- Develop the Customer project safety plan.
- Obtain proper permitting to construct the project.
- Develop a table of required tests to be performed by subcontractors at the project site.
- Document existing facility conditions that could incur a cost risk.
- Complete Contact List form
- Complete Address List form
- Conduct the subcontractor kickoff meeting
- Conduct the Customer staff/subcontractor meeting

III - CONSTRUCTION PHASE

During the Construction Phase at the Customer's facilities, the following steps will be performed:

- Initial M&V measurements and data collection.
- Coordination of site storage area for subcontractor construction material.
- Weekly progress meetings with subcontractors.
- Periodic update meetings with Customer's staff to inform Customer of all construction progress issues and schedule progress.
- Evaluation of schedule progress and compliance at the project site.
- Invoicing/Billing/Revenue recognition.
- Enforcing project safety plan at the construction site.
- Enforcing clean work site issues in the project facilities.
- Periodic testing and construction inspection.
- Request engineering assistance to support the construction field issues when and if required.



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IV - COMMISSIONING PHASE

During the Commissioning Phase at Customer's facilities, the following actions will be taken:

- Provide factory-trained technicians for start-up of all equipment and systems included in the Customer's project scope.
- Develop and distribute project Operations and Maintenance (O&M) Manuals for the Customer.
- Document the final control system calibration, adjustments, and owner training.
- Document final testing and adjustment of all equipment and systems included in the Customer's project scope.
- Complete and turn over final "As Built" drawings to the Customers.
- Assemble testing documentation.
- Provide training for Customer's staff.
- Obtain final M&V measurements and data collection.
- Develop punch list.
- Validate warranty start date.

V – CLOSEOUT PHASE

During the Project Closeout Phase, the following actions will be taken:

- Turn over required documentation to the Customers.
- Obtain the fiscal court signature on ESG Letter of Acceptance, signifying project closeout.
- Review final subcontractor billing.
- Closeout Customer's project subcontracts.
- Complete the Customer's project file.

ESG views Project Management as a vital part in our process. We review each project closely and assign Project Managers on a best fit basis. We don't assign using a "next available" approach, because the role of the Project Manager is too important not to look at each individual and their talents and background and blend them with the project. We have selected the Project Manager that represents the most fitting experience, expertise, and chemistry to ensure project success and 100% Customer Satisfaction.

ESG's assigned Project Managers work closely with the Account Executives to advise and assist in estimating and managing the project; the Performance Engineers to obtain technical information and advice; the Project Delivery Manager on resource needs; and the management, finance, and accounting support groups.

Project Managers are committed to staffing a project with a workforce capable of handling the technologies associated with the project. Project Managers also plan for and use selected personnel to achieve optimum results according to each customer's requirements.

Effective project management applies technical expertise, project knowledge, and people and communication skills, as well as management talent in a proactive manner to ensure contract commitments are met on time, within budget, and with the quality expected by the customer.

3. Engineering Design. Describe your firm's approach to the technical design of this project.

Our multi-phase engineering design approach is centered on ensuring that your project goals are met. We also work diligently to assure that Marshall County receives a project based on "best value" meaning that individual ECMs and the total scope of work are developed around the concept of multiple bids for equipment and services, and collective decision making that optimizes energy and operational savings to benefit Marshall County Fiscal Court.

Upon selection, our project development team will schedule a kick-off meeting and engage your designated representatives in a variety of planning activities.



During this meeting, we will:

- introduce key project team members and establish roles and responsibilities
- define your organizational structure and approval process
- discuss project priorities and immediate facility and infrastructure needs
- identify supplier, subcontractors, and technology preferences
- attain utility data release authorization letters and utility billings for two or more years
- establish site and facility access protocol
- discuss your preference for financing
- discuss your current and planned maintenance and operational budget

Once the above information is captured and documented, we will work with the County to establish a project plan. This plan will outline which buildings will be audited, what technologies will be applied, and at what pace the process will move.

Technical Energy Audit and Project Development

Following the planning phase of our engineering approach, we will initiate the Technical Energy Audit and Project Development phase. During this phase, we will perform a technical energy audit and develop the scope of the Guaranteed Energy Savings Performance project.

The information obtained through this development phase enables us to develop a project opportunity scope and to define the overall performance-contracting program. ESG's primary objectives are to utilize the information gathered through these activities in order to assist us in developing a program that will address your major concerns with respect to:

- High demand charges
- Need for improvements in AHU performance
- Improvements in lighting conditions (interior and exterior) with more efficient LED technology
- Replacement and/or upgrading older, inefficient and unreliable equipment
- Enhancing operational efficiency
- Reducing operating and maintenance costs
- Providing sustainable, long-term solutions

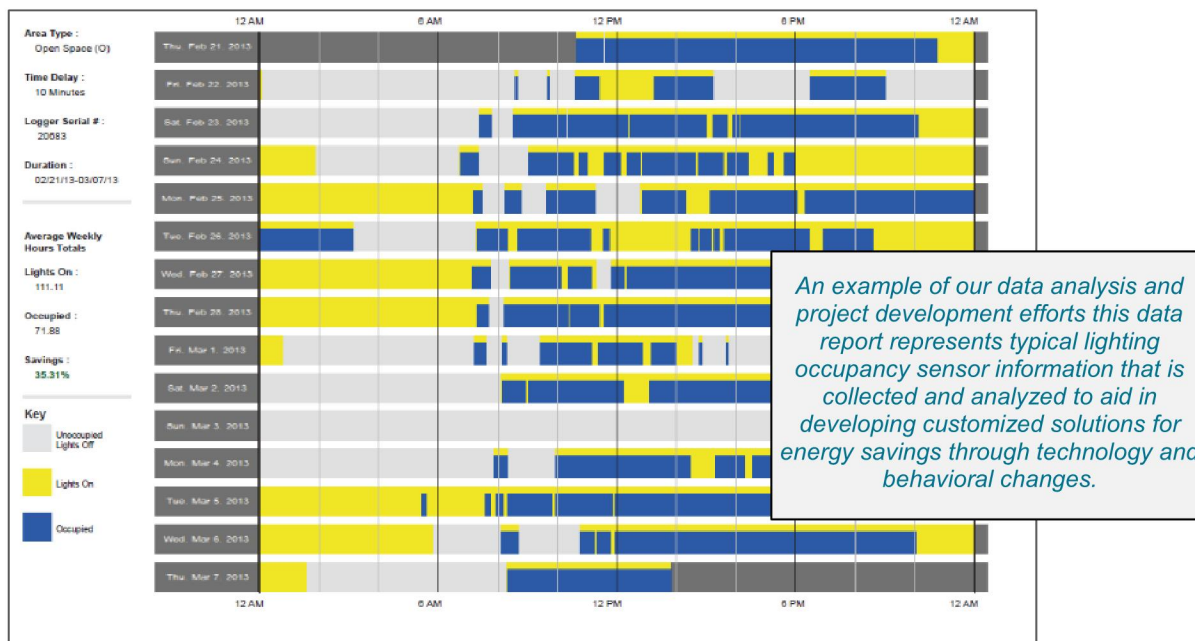
Our approach to technical design incorporates comprehensive engineering analysis and is based on proven best practices for solutions development that are customized to meet your specific facility and infrastructure needs and overall project objectives. We will use benchmarks of operational performance, maintenance standards, costs, and similar measures from other facilities to gauge the current level of your facilities' performance.

Standard activities during this engineering phase may include any combination of the following:

- Conducting staff interviews to understand your goals, challenges, and broad management issues
- Acquiring and assessing facility data, including: utility data, building drawings, operating parameters, planned and projected changes to the facilities, projected equipment replacements, existing service/maintenance contracts
- Performing facilities analysis and reviewing major building systems through the use of building analysis tools, such as data loggers, to determine actual operating conditions in the facilities, understand facility operation, identify operational inefficiencies, and assess the life expectancy of existing equipment



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- Building modeling to re-create or predict the present building energy usage levels and to define the impact that various changes to the building's envelope and mechanical, controls, and electrical systems will have on utility consumption
- Analyzing utility data and patterns of use to identify operational inefficiencies and assess rate structures

In order to ensure ongoing communication and support the development of a co-authored project, we will host regular meetings with your designated project team representatives throughout the process. At the end of this phase, we will report our findings and make a recommendation for the scope of the project. In our report we will include estimated cost and savings values to aid in the selection of work to be performed.

Advanced Project Development

Once the recommended scope of work from the Technical Energy Audit phase has been reviewed, we will further investigate the selected solutions and develop a detailed cost analysis. As an important part of this process, we will solicit multiple, competitive bids for each measure and will present the quotes for equipment, fixtures, installation, and design as applicable prior to contract award.

- *Soliciting multiple competitive bids to identify and recommend equipment ensures that the ESPC project for the County will be robustly supported by a maximized savings investment. Ultimately, determination of which products or services to use will be based on best value with consideration for life cycle cost, reliability, and efficiency ratings as opposed to low bid as the primary factor.*
- *To further ensure best value decisions can be reached we will also apply a cost analysis of the options which may be available concerning certain measures to separate or incorporate delivery of product and services.*

We will also complete working drawings and develop a project schedule with a construction timeline. This phase will be complete upon your acceptance of a finalized scope of work with cost and savings values, and contract negotiations following.



Development of Guaranteed Energy Savings Performance Contract

During this phase, we will submit contract documents and all required supplemental documentation for your approval. Our typical contract documents include:

- Contract Terms and Conditions
- Exhibit A: Scope of Work
- Exhibit B: Proposed Equipment List
- Exhibit C: Progress Payment Schedule
- Exhibit D: Insurance and Bonds
- Exhibit E: Progress Forms
- Exhibit F: Measurement & Verification
- Exhibit G: Support Services Agreement

ESG is honored to have worked with many government entities in western Kentucky. We have installed multiple Kentucky State projects implementing more ESPC contracts than any other ESCO, including three correctional complexes in eastern Kentucky. As a result of this history of successful ESPC project experience, we are able to produce accurate and comprehensive contracts with all required documentation in a timely manner.

4. **Training Provisions.** Describe your firm's capabilities in providing technical training for the Marshall County Fiscal Court facility personnel. Describe your firm's involvement in developing training manuals for facility staff.

Training Provisions

ESG appreciates the importance of training. Not only do we address the technical training needs to interact with the technologies and equipment we install, we also educate our customers on the overall ESPC process, including vital aspects such as Measurement and Verification. Our customized training programs are designed to meet your specific training needs and incorporate the best-suited techniques, resources, and training formats for your staff.

ESG's goal is to develop a program that promotes internal expertise, efficiency, and productivity. Therefore, we initiate our training by establishing a clear understanding of your goals and objectives through a needs analysis. Through this needs analysis, we will identify who will be trained and in what format the training will be provided.

Who Receives Training?

The extensiveness of our training programs is directed by your preferences. We fully support training efforts directed at the complete spectrum of trainee groups as illustrated by the table below. The table includes both technical and nontechnical types of training. The types of training in the table are listed in the order in which they will be addressed in this section, not necessarily in the order in which they are normally addressed and offered through our ESPC programs.



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Types of Training

Type of Training	Category of Training	Trainee Group
Technical (General)	Facility Maintenance Staff	All levels of Facility Maintenance including Technicians and Operators.
Technical (Specific)	Technicians and Operators	Only those responsible for specific equipment and systems operations and technical support.
Nontechnical	Energy Policy Development	Management.
Nontechnical	Customized Staff Training	Administrators, support and custodial staff, and other day-to-day facility occupants.
Nontechnical	Energy Conservation Training (ECT)	Facility and facility mission stakeholders, community at large.

The technical training categories shown are for those groups with direct responsibility for the management, oversight, operation, and maintenance of all energy systems and equipment within your facilities.

Training Strategy

The most effective training is a combination of approaches that provide ongoing reinforcement of a subject matter. Therefore, we provide a combination of training techniques that correspond with the results of our training needs analysis. The following table describes the specific instructional approaches that ESG uses to maximize training impacts.

Training Approaches

Training Types	Examples of Training Types	Applications/Considerations
Formal Classroom Training (Off-site)	<ul style="list-style-type: none">Off-site formal manufacturer training classesVocational training such as those offered by local colleges	<ul style="list-style-type: none">Typically utilized for highly technical applications such as refrigeration, boilers and controls.A train the trainer approach is encouraged due to the high cost to implement
Formal Classroom Training (On-site with manufacturer's instructor)	<ul style="list-style-type: none">in-house courses (one- or two-day)	<ul style="list-style-type: none">Recommended for refrigeration, boilers and controls, as well as other solutions such as computerized maintenance management software, water treatment and energy managementMore employees can attend this type of training for a lower cost
Internet Based	<ul style="list-style-type: none">Online	<ul style="list-style-type: none">This approach to training is beneficial for many solutionsDue to the scheduling flexibility inherent with this approach, more employees can attend this type of training for a lower cost

ESG offers a variety of training approaches customized to your specific needs and desired outcomes. In addition to these approaches, we provide detailed operations and maintenance manuals for all installed solutions.



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ESG utilizes a training team assembled from individuals with key roles in the current project, other staff with technical training experience, and, we will at times work with a specialized facilities maintenance consultant to provide support to guide the development of the training strategy. An additional component of ESG's training strategy will involve "formal reassessment" at planned points of the project to make sure that the training plan is meeting the objectives defined and is keeping pace with any new systems, tools, and techniques being used.

Nontechnical Training

ESG believes strongly that everyone who works within a facility can have an impact on the level of success of any energy conservation program. Therefore, we offer customized training that includes but is not limited to the following:

- **Energy Policy Development**
Working closely with our customer's management team, ESG evaluates the need for a facility Energy Policy. We can provide training on the value and importance of developing an Energy Policy and help facilitate the initial development effort. For those customers who currently have a policy, we will help to determine the extent of the policy's effectiveness and areas for improvement.
- **Customized Staff Training**
ESG believes that an ESPC program can provide the impetus for making an impact beyond the facility specific improvements. We often assist our customers with developing customized energy conservation training programs for administrators, support and maintenance staff, and other day-to-day facility occupants.

ESG Involvement in Developing Training Manuals

Through our ESPC programs, new equipment, systems, and technologies are introduced to our customers' facilities. ESG does not manufacture any products. Therefore, ESG has had the opportunity to work with all the major equipment, system, and technology suppliers regularly used in energy systems upgrade projects. We have developed a broad base of experience and working knowledge with HVAC equipment, building automation, lighting equipment, and a broad range of additional technology suppliers. Our experience, coupled with our recognition of the essential need for quality training, enables us to leverage the resources of the manufacturers with which we work to assemble excellent training manuals. These manuals are customized for each customer and each facility based on the project scope and range of equipment implemented. We utilize a combination of the materials provided by the manufacturers along with ESG input to create outstanding training manuals.

We will provide operation and maintenance manuals for all equipment replacements and/or upgrades at each location that will meet Marshall County's requirements, which will be established at the onset of the ESPC program. Included will be a comprehensive schedule of necessary preventative maintenance for all installations. Where applicable, we will provide Mylar and disk, reproducible "as-built" and record drawings (or such electronic equivalents as may be agreed to by Marshall County) of all existing and modified conditions associated with the project, conforming to typical engineering standards. These will include, where applicable, architectural, mechanical, electrical (including detailed wire diagrams), structural, and control drawings along with the operating manuals.

ESG Training Capabilities and Experience Summary

ESG provides quality, customized, technical and non-technical training that targets your objectives for each installed measure in the project scope. Our programs include staff energy training, facilities maintenance staff training, and nontechnical energy conservation training for those who work within the upgraded facilities. Because we are committed to providing complete Customer Satisfaction and because there is a direct link between the utility savings achieved and the level and quality of training that we provide, we are committed to providing a comprehensive, customized training program.



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5. **Monitoring and Verification.** Describe the company's approach to monitoring and savings verification of each recommended project's performance, including the frequency of such efforts. Note if an industry standard such as the *International Monitoring and Verification Protocol* is preferred by the company.

ESG's proposed methodology for on-going monitoring and savings verification of each recommended project's performance, including the frequency of such efforts are outlined below. We are also noting the industry standard used in our Measurement and Verification (M&V) process and will describe the preferred method.

Monitoring and Verification

A key activity of our partnership with our customers is M&V of savings results. Facility energy savings are determined by comparing the energy use before (baseline) and after the installation of energy conservation measures. Proper determination of savings includes adjusting for changes that affect energy use but are not caused by the conservation measures, such as differences in weather and occupancy conditions between the baseline and performance periods. In general, Savings = (Baseline Energy Use) adjusted - (Post Installation Energy Use).

These savings are compared to the guarantee in order to ensure that we are achieving our obligation. If a shortfall is identified, we will reconcile the shortfall annually in the amount equal to the difference between the guaranteed amount and the amount reported in the annual energy audit and accepted by your designated representatives. Unmet savings are where, (Measurement & Verification Savings) – (Guaranteed Savings) < 0.

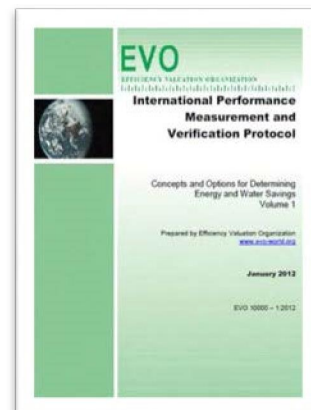
Methodology

Our traditional, and viable approach follows an industry-accepted methodology for measurement and verification associated with energy, operations and maintenance (O&M), and water projects. These methodologies comply with the International Performance Measurement and Verification Protocols (IPMVP), and we guarantee all energy savings using the most appropriate methodology for accuracy and cost effectiveness.

IPMVP

The IPMVP identifies procedures that, when implemented, allow building owners, energy service companies, and financiers of building energy efficiency projects to quantify energy conservation measure (ECM) performance and energy savings. The IPMVP provides an overview of current best practice techniques available for verifying savings from both traditionally and third-party-financed energy and water efficiency projects. ESG complies with IPMVP, 2009 and U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy:

- Vol. 1 –Concepts and Options for Determining Energy and Water Savings
- Vol. 2 – Concepts and Practices for Improved Indoor Environmental Quality
- Vol. 3 –Concepts and Options for Determining Energy Savings in New Construction



The IMPVP can be accessed at:
[http:// www.evo-world.org/](http://www.evo-world.org/)

Developing a Measurement and Verification Plan

The M&V plan is a document that defines measurement and verification methods for determining the savings resulting from the implementation of an ESPC project. We will begin development of this plan during the technical engineering and design phase of the project by capturing relevant data (current utility consumption, facility usage, control set points, etc.) required for baseline development. During the advanced project development, our engineers will provide recommendations for measuring and verifying the proposed ECMs. The plan may include a single option that addresses all the measures installed at a single facility or it may include several M&V options to address multiple measures installed at the facility.



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Our M&V plan will demonstrate that all metering and analysis will be performed in a consistent and logical manner and with a level of accuracy acceptable to all parties. The steps for defining a project-specific M&V plan include the following:

- Identifying your goals and objectives
- Specifying the characteristics of the facility and the ECM or system to be installed
- Specifying the M&V option, methods, and techniques to be used by measure
- Specifying data analysis procedures, algorithms, assumptions, data requirements, and data products
- Specifying the metering points, period of metering, and analysis and metering protocols
- Specifying accuracy and quality assurance procedures

M&V Options

IPMVP identifies four generic M&V approaches for energy and water projects. A summary of these approaches (Options A, B, C, and D) is provided in Table1: Measurement and Verification Options. M&V approaches are applied based on specific project features and considerations, including: the complexity of the ECMs, the savings value of the ECMs, the potential for changes in key factors between the baseline period and the performance period, and the degree of risk associated with achieving savings.

IPMVP Measurement and Verification Options

M&V Option	Performance and Operation Factors	Savings Calculations
Option A Partially measured retrofit isolation	Based on a measured retrofit isolation. Stipulated factors may be used if the variable is out of the influence of the ESCO (e.g. uncontrolled equipment operating hours). Spot or short-term measurements are taken at the component or system level.	Engineering calculations, component, or system models.
Option B Retrofit isolation of end use, measured capacity, measured consumption	Based on short-term or continuous measurements taken at the component or system level when variations in factors are not expected. Based on short-term or continuous measurements taken throughout the post-retrofit period.	Engineering calculations, components, or system models.
Option C Whole or main meter analysis	Based on long-term, whole-building utility meter, facility level, or sub-meter data.	Based on regression analysis of utility billing meter data.
Option D Whole or main meter analysis with calibrated simulation	Computer simulation inputs may be based on several of the following: engineering estimates; spot, short-, or long-term measurements of system components; and long-term, whole-building utility meter data.	Based on computer simulation model calibrated with whole-building and end-use data. Typically used only for new construction and major additions.

Performance factors indicate equipment or system performance characteristics such as kW/ton for a chiller or watts/fixture for lighting; operating factors indicate equipment or system operating characteristics such as annual cooling ton-hours.

Option Preferences

Each option has advantages and disadvantages based on site-specific factors and your specific M&V objectives. The level and duration of baseline and performance period measurements differs for each approach.

Option A involves using stipulated and measured values of key factors needed to determine energy savings. Options B and C involve using short-term, and continuous measurements. Option D may include spot, short-term, or continuous measurements to calibrate the model. Options A and B activities specifically determine retrofit-level performance and operation factors. Performance refers to equipment and system efficiency characteristics such



as kW/ton for chillers or watts/fixture for lighting. Operation refers to equipment and system operating characteristics such as annual cooling ton-hours for chillers or operating hours for lighting.

Option C performance factors are determined at the whole building or facility level. Option C operational factors are determined by utility meter or sub-metered data. Option D performance and operational factors are modeled based on design specifications. Measurements can be used to verify input values and calibrate the model.

Measurement & Verification option selection may vary depending on the energy conservation measure and building location. ESG recommends the use of either Option A or C to verify and measure energy savings. However, the final selection is dependent upon Marshall County's requests and/or measures installed. An important point here is that a balance be achieved (between the levels of M&V selected and the Energy Conservation Measures implemented) by applying a reasonable cost/benefit perspective. It is important to spend the appropriate amount on the M&V process. It is not prudent to overspend on M&V as it takes away from resource dollars that can go towards additional improvements. Options A and B are best applied to a single measure or independent systems that have little interaction with other systems installed. Option C is best applied where several interactive measures are installed together or the whole-building analysis is desired. Option D is a calibrated simulation of facility components and/or the whole facility.

Each of these options includes verifying or establishing a baseline of energy use and scheduled verifications after the installations have been completed. Energy and water use baseline are typically developed from an analysis of past energy use (a minimum 12-month period), adjusted for unusually events and circumstances, to pattern a typical annual energy use profile.

Either an estimated or actual metered result of annual hours run time per equipment/system will be performed, then a negotiated value is agreed upon with the facility's Energy Manager for use in each base period assessment. It is then common practice that any reference to hours shall be considered "agreed upon hours," unless actual metering of key performance factors and/or operational factors are used for savings calculations.

Option A

Step 1: Baseline Verification

Baseline verification occurs during the investment grade audit. ESG will verify the equipment counts, nameplate data, equipment dimensions, and type, as well as employ analysis of utility data for determining equipment and building energy consumption.

Start / Stop Measures (Motors, Lighting, etc.)

Baseline determination and savings for start/stop measures will be performed by tallying the number of units that will be controlled, calculating or measuring the actual power consumed, and monitoring or estimating the hours of operation. The reduction in run time will be agreed upon by both parties, and then the savings will be stipulated.

Variable Load Following (VFDs on Pumps, Fans, etc.)

Baseline determination and savings for equipment or processes that follow a varying load will be by a combination of analysis of data from the facility, spot or short-term measurements, engineering analysis, and utilization of published research data. These savings will then be agreed upon by both parties and stipulated.

Temperature Control Measures

This measure requires completing engineering analysis of the pre-measures operating characteristics of the equipment and determining the post-measures savings via acceptable engineering calculations. The results of the analysis and calculations will be agreed upon by both parties and the savings then stipulated.

Boiler, Steam System, Chilled Water Distribution System Measures

Data from the facility, such as circular recording charts from flow meters and boiler and chiller logs, will be utilized



in engineering analysis to determine system efficiencies and baseline energy consumption of the existing equipment. Savings of the proposed measures will be determined via engineering analysis, agreed upon by both parties, and then stipulated.

Option C

The purpose of Option C is to provide a systematic savings analysis for utility consumption, comparing a base year to a current year that has similar operational and environmental parameters. The required information is taken directly from a given facility's utility bills and regional weather data. The software system utilized in this tracking will be ENERGYCAP®, which is the preferred audit software for commercial and industrial facilities.

In order to ensure ongoing quality assurance in the measurement and verification process, several standards of quality will be implemented. All metering, monitoring (as specified), 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 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.

Verification of the Potential to Generate Savings

The potential for the installed ECM to generate savings should be verified at regular intervals during the contract period. Verifying the potential to generate savings can also be stated as confirming that:

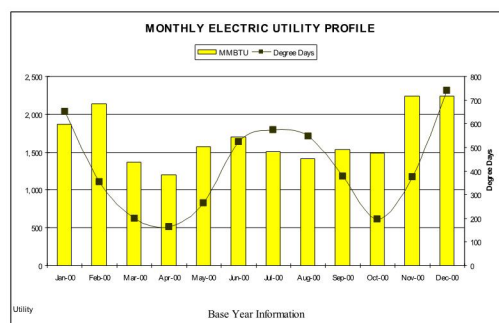
- The baseline conditions were accurately defined.
- The proper equipment/systems were installed.
- The equipment/systems are performing to specification.
- The equipment/systems have the potential to generate the predicted savings.

Baseline Verification

Baseline and post-installation energy use can be determined using the methods associated with several different M&V approaches. A range of options (A, B, C, and D) is available to provide suitable techniques for a variety of applications. How one chooses and tailors a specific option is based on the level of M&V rigor required to obtain the desired accuracy level in the savings determination and is dependent on the complexity of the energy conservation measure (ECM), the potential for changes in performance, and the measure savings value.

The function of verification is to reduce risk. The challenge of M&V is to balance M&V costs and savings certainty with the value of the conservation measures.

Baseline physical conditions (such as equipment inventory and conditions, occupancy, nameplate data, energy consumption rate, control strategies, and so on) are typically determined during the detailed energy study. Baseline conditions are established for the purpose of calculating savings and in case operational changes occurring post ECM installation mandate baseline energy use adjustments.





In almost all cases after the measure has been installed, one cannot go back and reevaluate the baseline as it no longer exists. Therefore, it is very important to properly define and document the baseline conditions. Deciding what needs to be monitored, and for how long, depends on factors such as the stability of the baseline, the variability of equipment loads, and the number of variables that affect the load.

Post-Installation Verification

Post-installation M&V is conducted to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and spot or short-term metering. Commissioning of installed equipment and systems is expected. Commissioning assures that the building systems perform interactively in accordance with the design documentation and intent.

Regular Interval Post-Installation Verification

At regular intervals, verification that the installed equipment or systems have been properly maintained, continue to operate correctly, and continue to have the potential to generate the predicted savings occurs. Although annual reports are typically required for establishing savings guarantees, reports should be prepared at least semiannually. This ensures that the M&V monitoring and reporting systems are working properly allowing for fine-tuning measures throughout the year based on operational feedback, and it avoids surprises at the end of the year.

6. Savings Calculations. List typical procedures, formulas and methodologies including special metering or equipment your firm may use to calculate utility and O&M savings. Include typical assumptions made in the calculations.

This section lists procedures, formulas, and methodologies including special metering or equipment ESG will use to calculate energy, water, and Operations & Maintenance (O&M) savings. Included are assumptions made in the calculations.

Savings Calculations

As a full service performance contracting Energy Services Company (ESCO), our business success is directly linked to our ability to provide a performance guarantee and then live up to that guarantee. We sell no products — what we provide is energy engineering solutions. Without a “product side” of the business we do not depend on other revenue channels, nor do we have any financial interdependency, split business focus, or competing products versus services interests to take into account or impact our business decisions. Our business is solely dependent on accurate and dependable savings calculations; measurable levels of performance that meet or exceed our guarantee.

Performance must be measured to validate success. Our success at meeting or exceeding our performance guarantees has turned each of our customers into an excellent reference for us and for the Performance Contracting process.

Our extensive list of happy customers substantiates our capabilities to provide outstanding, positive results. The willingness of our clients to share with their peers the positive experiences and results concerning our ESPC work is a source of pride for ESG. It is reflective of the close bonds formed by working successfully together to meet and exceed established, measurable objectives.

Procedures, Formulas and Methodologies

Due to the essential interaction and interdependency of various aspects of an ESPC project, certain topics included in this discussion will also be covered elsewhere in our RFP response.



Determining actual savings is a process that involves a number of steps with one of the most important steps being performance measurement. Measuring performance requires taking into account a number of interdependent activities, a variety of techniques and approaches, evaluating the related costs associated with the performance measurement activities, and then developing the most appropriate measurement strategy.

Procedures for Calculating Energy Savings

ESG has a proven track record of accurately calculating the impact of all types of Energy Conservation Measures (ECMs). Based on ESG's standard project being backed up by an annual energy savings guarantee, it is extremely important for our engineers to be accurate. We use a variety of procedures for calculating energy savings. What is common about each is the consistency, reliability, and preciseness of how the procedures are designed and utilized.

Throughout our ESPC program we communicate what, how, and when we do things so there is buy-in and validation of the procedures we use. This includes the procedures we use for calculating energy savings. Such steps enable us to maintain high quality standards for our processes and result in a high degree of customer satisfaction. Further demonstrating our ability to provide quality performance is our track record of exceeding every one of our utility savings guarantees that are in place. This is strong evidence of both the quality of work that we provide and the partnership that we establish with our customers.

The start point for calculating energy savings is to establish a baseline (or constant) from which you can begin to factor variables and calculate differentials. (Refer to Section 2.3.B. - General Approach to Project / e. Baseline Calculation Methodology)

Facility energy savings are determined by comparing the energy use before and after the installation of ECMs. The "before" case is called the baseline; the "after" case is referred to as the post-installation or performance period. Proper determination of savings includes adjusting for changes that affect energy use but that are not caused by the conservation measures. Such adjustments may account for differences in weather and occupancy conditions between the baseline and performance periods. In general, *Savings = (Baseline Energy Use) adjusted - (Post Installation Energy Use)*.

Baseline and post-installation energy use can be determined using the methods associated with several different Measurement and Verification (M&V) approaches. These approaches are termed M&V Options A, B, C, and D and are more completely discussed under Monitoring and Verification, in this section of the RFP response. A range of options is available to provide suitable techniques for a variety of applications.

How one chooses and tailors a specific option is based on the level of M&V rigor required to obtain the desired accuracy level in the savings determination and is dependent on the complexity of the ECM, the potential for changes in performance, and the measured savings value.

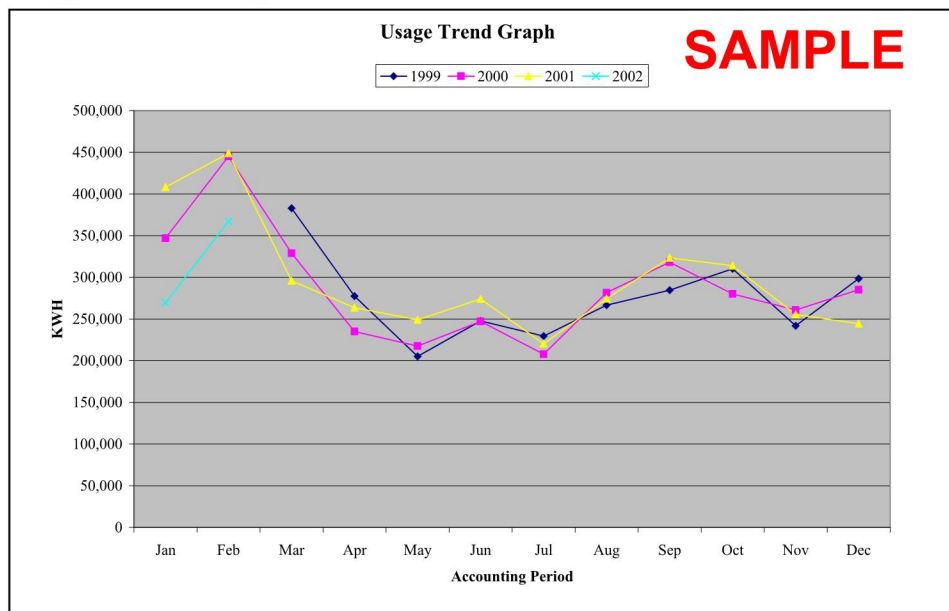
A key aspect of establishing a baseline is analyzing the utility bills and energy-use profiles. Utility baseline profiles are also utilized to identify potential ECMs and their magnitude. Analysis of the electric demand, electric load factor, electric power usage, and gas usage during peak and lowest usage months provides a wealth of knowledge to ESG's energy engineers. The method utilized for determining energy savings within most of our projects is based on a model that starts with the utility bills.



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Utility Cost and Usage Foundation



Having multiple years of utility usage data allows ESG engineers to clearly identify seasonal patterns and trends.

Once a baseline is established we utilize a number of data gathering tools and processes to obtain all the relevant information required to calculate energy consumption pre- and post-implementation in order to assess the economic impact of recommended facility improvements as discussed in the remainder of this section.

Basis and Types of Savings Calculations

Calculating savings requires the ability to measure against a fixed set of conditions which in an ESPC is the base period energy and water usage. The key driver in an ESPC is the energy savings. Much of our discussions will focus on this key driver. The method utilized for determining energy savings in most of our projects is based on a model that starts with the utility bills. A classic axiom of performance contracting is, "You can't save what you don't spend."

Utility baseline profiles are utilized to identify potential ECMs and their magnitude. Analysis of the electric demand, electric load factor, electrical power usage, gas usage during peak and lowest usage months, along with water usage, sewer charges, O&M records, and similar relevant ESPC data provides a wealth of knowledge to the trained eye of the energy management professional.

Specific energy savings calculations are performed for items that can be calculated using straightforward calculation methods. These include lighting savings, reduction of electric motor run times, reduction of the introduction of outside air to the spaces during unoccupied periods, night setback of space temperature, reset of temperatures supplied by HVAC units to minimize heating and cooling energy, etc.

Formulas

ESG, as a basis for calculating savings, uses widely and rigorously tested and approved engineering-based formulas and calculations; calculations based on energy engineering industry-accepted practices, an internationally developed standards for Measurement and Verification, ASHRAE standards, procedures described in the literature of the Association of Energy Engineers and similar relevant standards.



Spreadsheet-Based Calculations

Specific energy savings calculations are performed for items that can be calculated using straightforward spreadsheet-based calculation methods. These include lighting savings, reduction of electric motor operating times, reduction of the introduction of outside air to the spaces during unoccupied periods, night setback of space temperature, reset of temperatures supplied by HVAC units to minimize heating and cooling energy, etc.

These calculations are based on methodologies from *Modern Heating, Ventilating, and Air Conditioning* by George Clifford, SMACNA's *Energy Systems Analysis and Management Manual*, and the *2001 ASHRAE Fundamentals manual*. The data from the ASHRAE RP-385 software (Bin and Degree Hour Weather Data for Simplified Energy Calculations) is used in some of these calculations.

Two examples of spreadsheet-based calculations follow. Example 1 is for lighting and Example 2 is for water conservation.



Example 1: Lighting

Spreadsheet Based Calculation:

The lighting savings are calculated in a spreadsheet format based on two equations. The first equation calculates the energy cost savings. The energy cost savings from upgrading the lighting can be calculated by fixture type as follows:

$$\text{Energy Cost Savings (ECS)} = (\text{EF} \times \text{EW} - \text{PF} \times \text{PW}) \times \text{H} \times \text{EC}$$

Where:

EF = the existing number of fixtures, (see fourth column of Exhibit 2)

EW = the existing fixture wattage, (see fifth column of Exhibit 2)

PF = the proposed number of fixtures, (see seventh column of Exhibit 2)

PW = the proposed fixture wattage, (see eighth column of Exhibit 2)

H = the operating hours of the lighting, (see second column of Exhibit 2 for code to cross reference in Exhibit 1)

EC = the electrical energy cost, \$0.03187/kWh

The demand cost savings from upgrading the lighting can be calculated by fixture type as follows:

$$\text{DCS} = (\text{EF} \times \text{EW} - \text{PF} \times \text{PW}) \times \text{M} \times \text{DC}$$

Where:

M = the number of months the fixture contributes to demand,

(most are ten months, but see second column of Exhibit 1 for code to cross reference in Exhibit 2)

DC = the electrical demand cost, \$9.87/kW-month

The total cost savings from Exhibit 2 are \$36,394/yr (demand is \$20,972/yr and electrical energy savings is \$15,422/yr), but, the demand savings requires a diversity factor assumed to be 0.95, so the savings would actually be \$35,345. The total cost savings are then reduced by the amount of additional heating required by the HVAC equipment. This additional heating is calculated based on 80 percent of the heat being returned to the equipment and electric heat for a total cost of \$10,036/yr. Additional cooling is also required and is based on a coefficient of performance of 2.5. The additional savings is \$774/yr. Therefore, the total cost savings is \$26,057/yr.

Exhibits referenced in calculations are located on the following pages.



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Exhibit 1: Sample Hour Code Summary

Hour Code	Operating Hours Per Year
C2	2,400
C3	500
C4	2,090
C5	2,090
C6	3,000
C7	1,620
H1	4,320
O1	4,000
S1	500
Z1	8,760

Exhibit 2: Sample Room-by-Room Lighting Proposal

LOCATION	HOUR CODE	DESCRIPTION	EX QTY.	EX W/Fixt.	Ex. kWh	New Qty.	New W/Fixt.	New kWh	Annual kW SAVED	Annual Demand \$ SAVED	Total kWh \$ SAVED
Room 101	S1	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	3	83	125	3	50	75	1.0	\$11	\$2
Room 102	C4	4 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and standard electronic ballast	16	144	4,815	16	58	1,940	14.4	\$149	\$92
Room 103	C4	4 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and standard electronic ballast	16	144	4,815	16	58	1,940	14.4	\$149	\$92
Room 104	S1	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	42	1	50	25	0.3	\$4	\$1
Room 105	S1	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	42	1	50	25	0.3	\$4	\$1
Room 106	C4	4 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and standard electronic ballast	12	144	3,612	12	58	1,455	10.8	\$112	\$69
Hallway (107)	H1	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	13	83	4,661	13	50	2,808	4.5	\$47	\$59
Room 108	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	249	1	50	150	0.3	\$4	\$3
Room 109	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	249	1	50	150	0.3	\$4	\$3
Room 110	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	2	83	498	2	50	300	0.7	\$7	\$6
Room 111 (Weight Room)	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	7	83	1,743	7	50	1,050	2.4	\$25	\$22
Room 112	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	249	1	50	150	0.3	\$4	\$3
Room 113	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	2	83	498	2	50	300	0.7	\$7	\$6
Room 114	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	1	83	249	1	50	150	0.3	\$4	\$3
Room 115	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	3	83	747	3	50	450	1.0	\$11	\$9
Room 116	C6	2 lamp (75W each) incandescent vanity fixture retrofitted with 2 compact fluorescent 13W lamps with integrated ballast	1	150	450	1	26	78	1.3	\$13	\$12
Room 116	C6	100W incandescent retrofitted with a 18W compact fluorescent with integrated ballast	1	100	300	1	18	54	0.9	\$9	\$8
Room 117	C6	4 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and standard electronic ballast	2	144	864	2	58	348	1.8	\$19	\$16
Room 118	C6	2 lamp F40T12/34W surface mounted fixture retrofitted with 2 T8 lamps and LO electronic ballast	12	83	2,988	12	50	1,800	4.1	\$43	\$38



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Example 2: Water
Spreadsheet Based Calculation:

Sample Proposed System

New plumbing fixtures will be installed where appropriate. Sink faucets will be replaced if necessary otherwise aerators will be installed. New low flow showerheads will be installed. Low flow toilets will also be installed. The table below details the new plumbing system.

Sample New Plumbing Fixtures

Toilets		Gals per Flush
Zurn 1.6 Upgrade	0	1.60
Zurn 1.6 Retrofit	5	1.60
Zurn 1.6 Upgrade	67	1.60
No Upgrade	1	1.60
No Upgrade	0	1.60
American Standard 1.6 Tank	0	1.60
American Standard 1.6 Tank	8	1.60
Total	81	
Urinals		Gals per Flush
Zurn Upgrade	0	0.75
Zurn Upgrade	25	0.75
Zurn Retrofit	7	0.75
No Upgrade	0	0.75
No Upgrade	0	0.75
Total	32	
Sink & Faucets		Gals per Min
No Upgrade	57	2.50
1.5 GPM Aerator	0	1.50
0.5 GPM Aerator	14	0.50
Push Button Upgrade	0	0.50
0.5 GPM Aerator	1	1.50
New Goose Neck	0	1.50
1.5 GPM Aerator	5	1.50
4"/ 8" Push Button Upgrade	45	0.50
Single Push Button	13	0.50
Total	135	
Showers		Gals per Min
No Upgrade	8	2.50
Low Flow Shower Head	30	2.50
	38	



Savings Calculations

$$UW_{\text{existing}} = N \times G \times F \times D$$

UW_{existing} = Water used by urinals per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

F = Number of flushes per day

D = Number of days

$$TW_{\text{existing}} = N \times G \times F \times D$$

TW_{existing} = Water used by toilets per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

F = Number of flushes per day

D = Number of days

$$SFW_{\text{existing}} = N \times G \times T \times D$$

SFW_{existing} = Water used by sinks and faucets per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

T = Amount of time sink or faucet operates per day

D = Number of days

$$SFW_{\text{existing}} = N \times G \times T \times D$$

SFW_{existing} = Water used by sinks and faucets per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

T = Amount of time sink or faucet operates per day

D = Number of days

$$SHW_{\text{existing}} = N \times G \times T \times D$$

SHW_{existing} = Water used by showers per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

T = Amount of time shower operates per day

D = Number of days



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Sample Summary of Existing Usage

Description	No.	Efficiency or Rate (Factory Specs)	Frequency	Time	Yearly Use Kgal.
Toilets					
		Gals per Flush	Flushes per Day	Days	
Old Sloan Quiet Flush Valve	0	4.00	23.06	180	0
Sloan Regal Flush Valve	5	3.50	23.06	180	73
Old Delaney Flush Valve	67	4.80	23.06	180	1,335
Sloan 1.6 Flush Valve	1	1.60	23.06	180	7
1.6 Tank Top	0	1.60	23.06	180	0
3.5 Tank Top	0	3.50	23.06	180	0
5.0 Tank Top	8	5.00	23.06	180	166
Total	81				
Urinals					
		Gals per Flush	Flushes per Day	Days	
Old Sloan Royal Quiet Flush	0	1.50	9.62	180	0
Old Delaney/Crown	25	1.75	9.62	180	76
Sloan Regal Urinal Flush Valve	7	1.25	9.62	180	15
Push Button Urinal	0	0.75	9.62	180	0
Quick Close Urinal	0	0.75	9.62	180	0
Total	32				
Sink & Faucets					
		Gals per Min	Min per Day	Days	
Kitchen Sink	57	2.50	2.01	180	52
4 and 8" Center/Gooseneck/Lab Sink	0	2.50	2.01	180	0
4" and 8" Center/ Single Gooseneck	14	2.50	2.01	180	13
Single Faucet/ SPB/ Quick Close	0	2.50	2.01	180	0
Misc. Faucet	1	2.50	2.01	180	1
Old Goose Neck	0	2.50	2.01	180	0
4CC/ 8CC Faucet	5	2.50	2.01	180	5
4CC/ 8CC Faucet	45	2.50	2.01	180	41
Single Push Button	13	0.50	2.01	180	2
Total	135				
Showers					
		Gals per Min	Min per Day	Days	
Low Flow Shower Head	8	2.50	2.14	180	8
High Flow Shower Head	30	5.00	2.14	180	58
	38				
Irrigation System					
		Gals per Min	Min per Day	Days	
Irrigation System Soccer Field	3	20.00	120.00	80	576
Irrigation System Football Field	7	15.00	120.00	80	1008
					3434



$$UW_{\text{new}} = N \times G \times F \times D$$

UW_{new} = Water used by urinals per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

F = Number of flushes per day

D = Number of days

$$TW_{\text{new}} = N \times G \times F \times D$$

TW_{new} = Water used by toilets per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

F = Number of flushes per day

D = Number of days

$$SFW_{\text{new}} = N \times G \times T \times D$$

SFW_{new} = Water used by sinks and faucets per year

N = Number of fixtures

G = Gallons of water consumed by each fixture

T = Amount of time sink or faucet operates per day

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N = Number of fixtures

G = Gallons of water consumed by each fixture

T = Amount of time shower operates per day

D = Number of days



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Marshall County Fiscal Court



Sample Summary of Proposed Usage

Description	No.	Efficiency/Rate	Frequency	Time	Yrly Use
Toilets		Gals per Flush	Flushes per Day	Days	Kgals
Zurn 1.6 Upgrade	0	1.60	23.06	180	0
Zurn 1.6 Retrofit	5	1.60	23.06	180	33
Zurn 1.6 Upgrade	67	1.60	23.06	180	445
No Upgrade	1	1.60	23.06	180	7
No Upgrade	0	1.60	23.06	180	0
American Standard 1.6 Tank	0	1.60	23.06	180	0
American Standard 1.6 Tank	8	1.60	23.06	180	53
Total	81				
Urinals		Gals per Flush	Flushes per Day	Days	
Zurn Upgrade	0	0.75	9.62	180	0
Zurn Upgrade	25	0.75	9.62	180	32
Zurn Retrofit	7	0.75	9.62	180	9
No Upgrade	0	0.75	9.62	180	0
No Upgrade	0	0.75	9.62	180	0
Total	32				
Sink & Faucets		Gals per Min	Min per Day	Days	
No Upgrade	57	2.50	2.01	180	52
1.5 GPM Aerator	0	1.50	2.01	180	0
0.5 GPM Aerator	14	0.50	2.01	180	3
Push Button Upgrade	0	0.50	1.01	180	0
0.5 GPM Aerator	1	1.50	2.01	180	1
New Goose Neck	0	1.50	2.01	180	0
1.5 GPM Aerator	5	1.50	2.01	180	3
4"/ 8" Push Button Upgrade	45	0.50	1.01	180	4
Single Push Button	13	0.50	1.01	180	1
Total	135				
Showers		Gals per Min	Min per Day	Days	
No Upgrade	8	2.50	2.14	180	8
Low Flow Shower Head	30	2.50	2.14	180	29
Total	38				
Irrigation System		Gals per Min	Min per Day	Days	
No Upgrade	3	20.00	120.00	80	576
No Upgrade	7	15.00	120.00	80	1,008
					2263



Response to Request for Proposals for Marshall County Fiscal Court



$$W_{\text{savings}} = W_{\text{existing}} - W_{\text{new}}$$

W_{savings} = Water Savings per Year in Gallons

$$W_{\text{existing}} = UW_{\text{existing}} + TW_{\text{existing}} + SFW_{\text{existing}} + SHW_{\text{existing}}$$

$$W_{\text{new}} = UW_{\text{new}} + TW_{\text{new}} + SFW_{\text{new}} + SHW_{\text{new}}$$

Historical data and user population determines flushes per day for the urinals and toilets along with the minutes per day that the sinks/faucets and showers operate. For this example, flushes per day = 23.1 for toilets and 9.6 for urinals. Sinks/faucets operate 2 minutes and showers 2.14 minutes.

The new plumbing fixtures have a 15-year simple payback. The reason for the extended payback is that the facility does not currently pay a sewer charge. Sewer charges are typically more expensive than water. Sewer charges can be significant in reducing water conservation payback.

This facility was subject to a sewer charge starting in 2004. This reduced the payback for the water conservation program. If the facility was currently being charged for sewer, the simple payback for the water conservation program would be reduced to less than 8 years.

Reality Check

ESG's final step in calculating savings for a building involves an overall analysis for ECM interactions and any potential "double accounting" or generally unrealistic levels or percentages of savings. All buildings must ultimately pass a "reality check" for the percent of gas, electric, and water that is calculated to be saved. ESG's "Best Practice" is to flag calculations that go beyond a realistic cost per square foot, Btu's per square foot, or gallon usage relative to some meaningful "customer specified" parameter.

Methodologies

As mentioned earlier, the major driving force behind ESPC is energy savings, thus much of our discussion will focus on energy. Other utilities and O&M opportunities will be analyzed by ESG using the same comprehensive and exhaustive techniques and methodologies applied to those efficiency measures as well.

Among the various methodologies we employ for calculating energy savings are spreadsheet-based calculations (discussed earlier), total building modeling, other standard Measurement and Verification (M&V) methodologies, and a computerized energy accounting database.

Total Building Modeling

Based on the specific need, ESG will utilize building modeling software to calculate the impact of more complex and highly interactive measures.

Post-Installation Verification

Post-installation M&V is conducted to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and spot or short-term metering. Commissioning of installed equipment and systems is expected. Commissioning assures that the building systems perform interactively in accordance with the design documentation and intent.



Regular Interval Post-Installation Verification

At regular intervals, verification that the installed equipment or systems have been properly maintained, continue to operate correctly, and continue to have the potential to generate the predicted savings occurs. Although annual reports are typically required for establishing savings guarantees, reports should be prepared at least semiannually. This ensures that the M&V monitoring and reporting systems are working properly allowing for fine-tuning measures throughout the year based on operational feedback, and it avoids surprises at the end of the year.

Follow-up ensures that equipment is working properly and able to achieve the expected savings.

Computerized Energy Accounting Database

ESG uses EnergyCAP®, a computerized energy accounting database to track cost and consumption during the guarantee period. Once a baseline is established and entered into the program, EnergyCAP® uses this as the benchmark of contract performance.

O&M Savings

ESG uses a combination of extensive historical data from our ESPC customers, various facilities maintenance survey reports from a number of sources, and trade publications of the facilities maintenance industry, and maintenance software (Maximo and other similar systems) to obtain benchmark data and evaluate O&M savings opportunities.



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Special Metering Equipment

The following is a list of the most frequently/likely equipment choices that ESG would use for Marshall County facilities. Subcontractor partners that we may elect to use will add to this list with their own specific equipment.

<i>Function</i>	<i>Instrument</i>
Total Building Power Monitoring/ Trending Logger	<i>Amprobe Total Building Power Analyzer</i>
Water Flow Testing Equipment	<i>Bell & Gossett RO-5 readout kit</i>
Motor Run Time Loggers	<i>Onset Motor Loggers</i>
Temperature Loggers	<i>Onset Temperature Loggers</i>
Electrical Amperage Probes	<i>Fluke Meters (Various Models)</i>
Decibel Meter	<i>Extec Decibel Meter</i>
Magnetic Field Sensor	<i>Magnetic Ballast Inductive Amplifier</i>
Lighting Run Time Loggers and Light Level Meters	<i>Onset Lighting Loggers</i>
Footcandle Meter/ Electronic Measurement Meter	<i>Extech Footcandle Meters Zircon Electronic Measuring Unit</i>
Air Quality Testing Equipment	<i>Testo CO₂ Monitor</i>
Airflow Measurement Test Equipment	<i>EXTECH Instruments Thermo-Anemometer</i>
Air Pressure Measurement	<i>Magnehelic Pressure Gauges</i>
Humidity Loggers	<i>Onset Humidity Loggers</i>
Infrared Temperature Guns	<i>Raytech Infrared Temperature Gun</i>
Airflow Measurement Test Equipment	<i>Digital Airflow Hood</i>

As illustrated in this section, ESG has the necessary experience, resources, and tools required to evaluate, calculate, and measure energy, water, and O&M savings.

7. Dollar Savings Calculations. Describe the procedure to assign dollar values to the O&M and utility savings.

Dollar Savings Calculations

Energy and water efficiency projects meet a range of objectives, including upgrading equipment, improving performance, helping to achieve environmental compliance, or simply saving energy and money. All projects have one thing in common— an initial financial investment. All financial investments have a common goal — making money or a “return” on investment. The rate of return is measured by various financial yardsticks such as simple payback, return on investment (ROI), or internal rate of return (IRR). However it is measured, “return on investment” must come in the form of dollars saved to offset the investment cost (generally financing and debt service).

Dollar savings calculations are simple mathematical computations made by applying the price of each energy or demand unit (kWh, kW, or thermal unit BTU) to the determined savings. The price of energy, water / sewer, or other utility supplied should be the utility provider’s rate schedule or an appropriate simplification thereof. Appropriate simplifications use marginal prices which consider all aspects of billing affected by metered amounts, such as consumption charges, demand charges, transformer credits, power factor, demand ratchets, and early payment discounts.



ESG, together with our customers, makes these determinations at the beginning of the process. The rates to be applied and the computational method are mutually agreed upon so there is no ambiguity to the bottom-line results.

The basic formula used is as follows:

$\text{EUR} \times \text{CUTR} = \$ \text{Saved}$

(Energy Unit Reduction x Customer's Utility Tariff Rate = Dollars Saved)

With respect to O&M savings, a process of joint evaluation, thorough review of, and discussions about recent historical costs for Operation and Maintenance will take place between ESG and the Marshall County Fiscal Court. Maintenance records and review of related cost accounts are used to determine true O&M costs. These efforts result in a mutual agreement on the appropriate level of stipulated costs associated with O&M, which will be closely studied for compliance with ESPC policy guidelines.

8. **Maintenance Contracts.** Describe the types of equipment maintenance or monitoring services that may be included. Comment on whether The Marshall County Fiscal Court maintenance staff can perform some of these duties if desired, and describe any impact on the guarantee. (These duties could include programming and maintaining the control system, installing lighting retrofits, maintaining HVAC equipment, etc.). Describe the required length of the maintenance contract and the relationship with the guarantee in the event that The Marshall County Fiscal Court chooses to terminate the maintenance contract prior to the end of the energy services agreement.

This section describes the types of services included in the maintenance contract. We will have further discussions on whether Marshall County's maintenance staff can perform some of these duties if desired and we will describe any impact on the guarantee. (These duties could include programming and maintaining the control system, installing lighting retrofits, maintaining HVAC equipment, etc.). Also in this section we describe the required length of the maintenance contract and the relationship with the guarantee in the event that Marshall County chooses to terminate the maintenance contract prior to the end of the Performance Contract.

Maintenance Contract Flexibility

Dollars not spent on maintenance contracts are dollars that can be spent on additional upgrades and improvements. To the greatest extent possible, we work with our customers to minimize the need for or dependence on maintenance contracts. This is accomplished primarily through incorporating outstanding technical training in our ESPC programs.

Decisions concerning the need for maintenance contracts should be strategic and based on a cost/benefit basis. It is usually more desirable to have our customers obtain the skill levels necessary to handle the majority of their maintenance and repair needs rather than to pay for very expensive maintenance contracts that generally require long-term commitments. Certainly there are situations where the cost/benefit ratio favors maintenance contracts over some highly specialized skills training that may infrequently be used. With this in mind there are circumstances under which ESG supports the use of maintenance contracts. But we see this as the exception rather than the rule. Based on the reality of the circumstances related to existing skill levels, full or partial complement of FTE positions, time allocation flexibility and preferences of Marshall County, ESG can incorporate maintenance contract services in your ESPC project.

Owner's Staff Participation

The degree to which the Marshall County's maintenance staff can perform some of the duties (such as programming and maintaining the control system, installing lighting retrofits, maintaining the HVAC equipment, etc.) is determined through the discovery process of interaction during project development. We have no set policy on such matters but are guided by the principal that dollars not spent on maintenance contracts are dollars that can be spent on additional upgrades and improvements in your facilities. Likewise, dollars that can be saved by utilizing existing



customer resources and staff are dollars that can be spent on additional upgrades and improvements. Marshall County's desire to utilize their staff to offset the need for maintenance contracts drives these discussions and decisions.

Impact on the Guarantee

Our primary objective is clear and consistent. It is to structure a partnership with Marshall County that results in providing the greatest positive impact by stretching the energy savings dollar resources as far as possible. Whether equipment is maintained by Marshall County's staff or through a maintenance contract, there is no impact on the guarantee as long as the minimal maintenance intervals and procedures established by the manufacturer are followed and documented.

Length of Maintenance Contract

ESG does not have any specific maintenance contract requirement. The need for such contracts is closely scrutinized and mutually determined. When it is deemed to be advantageous, a maintenance contract may be established for one or more of the major systems installed as an Energy Conservation Measure (ECM). The term of such a contract will be established based on Marshall County's desires and needs.

Termination of Maintenance Contract and Impact on Guarantee

Equipment or systems maintenance contracts have little if any bearing on our guarantee. In our ESPC programs, one of our objectives is to assist our customers through high quality, effective technical training to minimize maintenance contracts and where possible to eliminate them. Our guarantees are linked to:

1. Proper design
2. Proper selection
3. Proper installation
4. Proper operation
5. Proper maintenance of equipment and technology

As long as equipment is properly maintained, whether through a maintenance contract or by the Marshall County's staff, there is no impact on the guarantee.

To verify that our performance guarantee has been achieved, it is essential that we provide a Measurement and Verification (M&V) service. This is sometimes viewed as a maintenance contract. Even when we view M&V in this perspective, our objective remains the same; to minimize the time and cost associated with this aspect of the process. Doing so allows our customers to conserve energy savings dollars for use elsewhere.

Our approach to maintenance contracts includes:

- Making them as flexible as possible.
- Customizing them to meet our customer's needs.
- Shortening their duration.
- Reducing their costs.
- Eliminating them where possible.

We will work with Marshall County to minimize dependence on maintenance contracts and to maximize the use of energy savings dollars to achieve more installed ECMs. If the preference of Marshall County is to incorporate maintenance contracts for specific equipment or systems ESG has strong relationships with local mechanical firms who can provide quality services and ESG will assist in structuring and securing such contracts.



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9. Billing and Invoices. Describe your standard billing procedures and attach a sample invoice.

Billing and Invoices

ESG will work closely with Marshall County to mutually determine the most effective and appropriate manner in which to handle billing procedures. We are pleased to take into account your preferences in this matter. In general terms, we initiate project payment invoices when construction begins and then on a "percentage completion basis" throughout project construction. However, as stated above, we continually adjust our billing procedures to fit our customers' preferences, regulations, and/or needs.

In our continuing efforts to be responsive to your needs, we will schedule meetings early in the process to understand Marshall County's invoicing and payment processing procedures. During this time, we will also discuss and mutually resolve the manner, the procedures and scheduled intervals for invoice submission, and the billing and invoice format to utilize.

Form ODA-24
Rev. 10-2002

Commonwealth of Kentucky
FINANCE AND ADMINISTRATION CABINET
DEPARTMENT FOR FACILITIES MANAGEMENT

INVOICE - PROGRESS PAYMENTS FOR CAPITAL CONSTRUCTION

BY	FUND	AGENCY	ORG	AP	AL	PRU	JOSEPH/NO	SUB	TP	OBJECT CLASS	AMOUNT	INVOICE NO	DATE	CONTRACT NO	DOC SUFFIX
02	200	785	D785	1T	234	1234	LB003	00	Z	E703	Contract amount	1	4/3/2003	C-12345678	1
											AGE: 1	1	VENDOR ID NO	VENDOR SUFFIX	
												61-1234567	03		

PROJECT TITLE: COPY FROM YOUR AWARD LETTER
PROJECT LOCATION: NEAREST TOWN OR CITY
CONTRACTOR NAME: YOUR CONSTRUCTION COMPANY NAME
ADDRESS: ADDRESS AS IT IS SHOWN ON YOUR CONTRACT DOCUMENT
ANY CHANGE MUST BE REQUESTED IN WRITING
ZIP:

FOR WORK DONE: FROM (date) ENTER INCLUSIVE DATES
THRU (date) AFTER COST BREAKDOWN APP.
FILE NO:

Delivery Type: ☐ Final ☐ Partial ☐ Date of Award:

TOTALS	AMOUNT	LABOR	MATERIALS	LABOR	MATERIALS	COMPLETED TO DATE	MATERIALS STORED ON SITE	TOTAL COMPLETED TO DATE
(BROUGHT FORWARD FROM R010-2)	2,105,700.00	1,212,700.00	1,493,000.00	LEAVE BLANK	UNTIL YOU START	INVOICING		

THIS IS TO CERTIFY THAT THE WORK AS LISTED HAS BEEN COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, THAT ALL LABOR STANDARD REQUIREMENTS HAVE BEEN FULFILLED BY THE PRINCIPAL CONTRACTOR AND ALL SUBCONTRACTORS UNDER THIS CONTRACT AND THAT ALL LAWFUL CHARGES FOR MATERIALS, SERVICE, ETC., COVERED BY PREVIOUS CERTIFICATES FOR PAYMENT HAVE BEEN PAID.

YOUR CONSTRUCTION COMPANY
Company Title
AUTHORIZED SIGNATURE - THIS DOCUMENT MUST BE PRINTED OUT AND SIGNED
Contractor's Signature Date

RETAINAGE
STANDARD AT ☐ 10% ☐ 5% ☐ L.S.
ESCROW AMOUNT
LESS RETAINAGE

CHECKED BY: (Architect/Engineer) Date:
APPROVED BY: (Project Engineer) Date:
AUDITED BY: Date:
APPROVED BY: (Director, Division of Engineering) Date:
APPROVED BY: (Administrative Services Section) Date:
APPROVED BY: (State/Federal Agency, as applicable) Date:

TOTAL DUE CONTRACTOR
LESS PREVIOUS PAYMENTS
AMOUNT DUE THIS MONTH
LESS
CHECK TO CONTRACTOR

THIS WILL BE BLANK UNTIL 1ST PAYMENT

Sample Invoice for the Commonwealth of Kentucky



Response to Request for Proposals for Marshall County Fiscal Court



FORM NO. B210-2 INVOICE CONTINUATION SHEET FOR CAPITAL CONSTRUCTION												
PROJECT NAME: Enter Project Name as Shown on Award Letter										Sheet 1 of 1		
PROJECT LOCATION: Nearest City or Specific Location Information												
ITEM	DESCRIPTION OF WORK	AMOUNT	BREAKDOWN		COMPLETED TO DATE		MATERIALS STORED ON SITE	AMOUNT COMPLETED THIS MONTH	TOTAL COMPLETED TO DATE	% COMPLETED	PREVIOUSLY BILLED	BALANCE REMAINING
			LABOR	MATERIALS	LABOR	MATERIALS						
1	JOB MOBILIZATION	53,000.00	5000.00	48000.00								0
2	EXC. FILLING AND GRADING	110,000.00	110000.00									0
3	PAVING	8,000.00	3000.00	5000.00								0
4	SITE WORK CONCRETE	47,000.00	25000.00	22000.00								0
5	BRICK PAVING	18,000.00	12000.00	6000.00								0
6	SODDING	10,000.00	4000.00	6000.00								0
7	BUILDING CONCRETE	590,000.00	325000.00	265000.00								0
8	PRECAST CONCRETE	139,000.00	23000.00	116000.00								0
9	MASONRY	192,000.00	120000.00	72000.00								0
10	MISC & ORN METAL	65,000.00	15000.00	50000.00								0
11	CARPENTRY & MILLWORK	11,000.00	3000.00	8000.00								0
12	WATERPROOFING	2,700.00	1700.00	1000.00								0
13	ROOFING AND RELATED WORK	20,000.00	8000.00	12000.00								0
14	CAULKING	12,000.00	7000.00	5000.00								0
15	SKYLIGHT	4,000.00	1000.00	3000.00								0
16	GLASS, GLAZING, ALUMN	17,000.00	7000.00	10000.00								0
17	ALUMINUM WINDOWS	59,000.00	10000.00	49000.00								0
18	HOLLOW METAL	29,000.00	9000.00	20000.00								0
19	WOOD DOORS	24,000.00	6000.00	18000.00								0
20	HARDWARE	37,000.00	7000.00	30000.00								0
21	LATHING AND PLASTERING	25,000.00	13000.00	12000.00								0
22	ACOUSTICAL CEILINGS	29,000.00	9000.00	20000.00								0
23	RESILIENT TILE	31,000.00	8000.00	23000.00								0
24	CERAMIC TILE	67,000.00	35000.00	32000.00								0

Sample Invoice

10. Provision of Funding. Briefly describe the types of funding arrangements provided by your firm for past projects. Include a brief description of the source of funds and the potential dollar amounts currently available to your firm to finance these types of projects. Indicate what representative interest rates may be available, financing terms and other variable economic factors associated with each method. Please comment on how you would work with The Marshall County Fiscal Court to utilize tax-exempt financing or other methods to keep financing costs at a minimum.

Sources, Types and Costs of Financing Available and Recommended for this Program

Financing is a critical aspect of the contracts provided by ESG. The essence of our business is that projects pay for themselves through savings and we are accustomed to assisting customers in structuring and accessing the financing so that it is "funded" through savings generated by the project.

ESG has in-house financing expertise that is available to assist customers with project financing as an included service. ESG's Director of Finance, Ted Edgar, is available to address questions about project financing and ready to offer his expertise and assistance where needed. Ted has been an active and engaged project team member over eight years and has contributed greatly to our past project financing efforts on behalf of our customers.

He continues to work closely with our development teams as we generate each project financial pro forma and prepare documentation to address the financial aspects of our ESPC projects.



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We maintain relationships with various financial institutions to make sure that the best and most appropriate financing is available to our customers. Bank of America, BB&T, Capital One, PNC, Regions Bank and SunTrust are some of the institutions we currently work with to offer specialized tax-exempt financing. With respect to project financing, we intend to provide whatever level of service and support you desire.

If you choose, ESG will solicit bids from local banks of your choice, financial agent lenders such as Ross Sinclair or assist you in pursuing the financing through one of KACo's programs. KACo Finance Corporation (KACoFC) is a new bond pool program designed to help counties and local governments receive a higher Standard & Poor's Bond Rating than most counties could achieve on their own. Savings through the KACoFC are achieved in several ways. Due to the number of borrowers going to market at one time, via the KACoFC bond pool, KACoFC is able to control the cost of issuance, making it possible for many small borrowers to participate in the same way as large borrowers. KACo's insurance programs and the KACo County Leasing Trust are jointly funding the KACoFC debt service reserve to help achieve the highest rating possible for your County thus eliminating the need to borrow additional funds to cover this necessary cost of issuance.

Another option to consider is the Master Lease through the Commonwealth of Kentucky. Pursuant to [KRS 45A.050\(3\)](#), political subdivisions, including counties, may participate in the state agency Master Agreements to the same extent as agencies of the Commonwealth.

Current rates for fifteen-year tax-exempt financings are approximately 3.2% to 3.8% (July 2017). We work closely to make sure that our engineered project solutions are appropriately tailored to the financing requirements of Marshall County and available offerings in the marketplace. 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.

Most of our 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. These transactions (normally single-investor financings) are often structured as lease-purchase agreements, and sometimes as installment purchase agreements. Typically, these lease-purchase or installment purchase agreements are appropriation-based, and do not constitute long-term debt for our customers.

As a rule, ownership of the energy conservation measures provided by ESG passes to the customer (Marshall County) on installation and acceptance. The lender retains a security interest or collateral position in the measures. In most cases, there is no other collateral provided in financing performance contracts.

ESG intends to provide whatever level of service and support Marshall County desires to secure the best project financing options available.

Our Sr. Account Executive Teresa Barton, has extensive experience in guiding you through the process, working with the Department for Local Government on required forms, hearings and documents needed for approval.

**ESG – Experienced in ESPC
Project Financing**

In most of our past project work with local governments, ESG worked closely with the Treasurer, County Attorney, and Executive staff to secure competitive financing for these projects. We will investigate all options for this project.

Our objective is to assist in any way to obtain the most beneficial interest rate for Marshall County Fiscal Court.



11. Provision of Insurance. Describe level and types of all insurance policies applicable to an ESPC project.

Provision of Insurance

While final insurance provisions will be resolved as a matter of contractual negotiations, in principle ESG will comply with the stated requirements for insurance as outlined in the RFP. The requirements for insurance outlined in the RFP have been restated below. Our extensive experience in ESPC project work, serving a broad customer base, has provided us with a great deal of experience in addressing and satisfying the insurance requirements of our customers. The following requirements for this ESPC program will be adhered to with only minor modifications or additions (see inserted text):

1. The Contractor shall furnish Marshall County with certificates evidencing the required insurance coverage prior to commencing work. Contractor shall keep up-to-date copies of such certificates on file with Marshall County until work is completed. Marshall County may require Contractor to submit policy endorsements or complete policy copies of the required insurance.
2. Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by Contractor, its agents, representatives, employees or subcontractors.
3. Minimum Scope of Insurance: Coverage shall be at least as broad as:
 - a. Insurance Services Office commercial general liability coverage ("occurrence" Form CG 0001, Ed. 10/93).
 - b. Insurance Services Office Form CA 0001 (Ed. 12/93) covering automobile liability, Code 1 "any auto."
 - c. Workers' compensation insurance as required by the Labor Code of the Commonwealth of Kentucky and employer's liability insurance.
4. Minimum Limits of Insurance: Contractor shall maintain limits no less than:
 - a. Commercial General Liability: (To be determined) (ESG's standard coverage provides for \$1m per occurrence and \$2m annual aggregate with additional amounts available under an umbrella.) combined single limit per occurrence for bodily injury, personal injury and property damage with an (to be determined) (ESG's standard coverage is as indicated above.) annual aggregate.
 - b. Automobile Liability: \$500,000 combined single limit per accident for bodily injury and property damage.
 - c. Workers' Compensation and Employers Liability: Workers' compensation limits required by the Labor Code of the Commonwealth of Kentucky and employers' liability limits of \$1,000,000 per accident.
5. Other Insurance Provisions: The policies are to contain, or be endorsed to contain, the following provisions: Commercial General Liability and Automobile Liability Coverages:
 - a. Marshall County, its officers and employees are to be covered as "insureds" as respects: liability arising out of activities performed by or on behalf of the Contractor; general supervision of the work by Marshall County; products and completed operations of the contractor; premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to Marshall County, its officers or employees.
 - b. The Contractor's insurance coverage shall be primary insurance as respects Marshall County, its officers and employees. Any self-insurance maintained by Marshall County shall be excess of the Contractor's insurance and shall not contribute to it.
 - c. Any failure to comply with reporting provisions of the policies shall not affect coverages provided to Marshall County, its officers or employees.
 - d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought except with respect to the limits of the insurer's liability.



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- e. Workers' Compensation and Employers Liability Coverage. The insurer shall agree to waive all rights of subrogation against Marshall County, its officers and employees for losses arising from work performed by the Contractor for Marshall County.
- f. All Coverages. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to Marshall County.
- g. Acceptability of Insurers
 - 1. Insurance is to be placed with insurers with an A.M. Best's rating of no less than A VII, authorized to write insurance in the Commonwealth of Kentucky.
 - 2. Verification of Coverage (ESG is providing a sample of a General Certificate of Insurance after Page 4.)
 - 3. The Contractor shall furnish the Marshall County with certificates evidencing the required insurance coverage prior to commencing work. Contractor shall keep up-to-date copies of such certificates on file with Marshall County until work is completed. Marshall County may require Contractor to submit policy endorsements or complete policy copies of the required insurance.
- h. Subcontractors
 - 1. Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.
 - 2. The Contractor shall provide all Risk Insurance in an amount of not less than one hundred percent (100%) of the insurable value of all the work. The coverage is to be written on CP00200695 or equivalent acceptable to Marshall County. All coinsurance clauses in the Risks Insurance policy will be waived. All rights of subrogation against the Marshall Fiscal Court will be waived by the insurer. Such insurance shall be for the benefit of the ESCO, Marshall County, and any Subcontractor engaged on this project, as the Marshall County shall find their respective interest may appear. The Risks Insurance must be dated and in force on the date indicated in the work order to begin work. (Typically once equipment is installed in Marshall County's building it is covered by Marshall County's all Risk insurance. ESG carries installation floater coverage for ESPC retrofit equipment and materials stored, or yet to be installed, that is located at Marshall County's facilities.)
 - 3. The insurance coverage required by this contract shall be in compliance with the Commonwealth of Kentucky's Revised Statutes Chapter 304. Insurance coverage shall be placed with an Insurance Company holding a Certificate of Authority issued by Kentucky Department of Insurance. Insurance coverage shall be placed through a resident or non-resident Licensed Agent authorized to do business in Kentucky.
- i. A Certificate of Insurance or Certificates of Insurance will be submitted, the latter if the Contractor does not have both his Commercial General Liability and Automobile Liability policies with the same vendor or on the same policy.
- j. The Certificate of Insurance or Certificates of Insurance will have the following endorsements as an attachment to the Certificate or Certificates.
- k. Marshall County Fiscal Court will be named as an additional insured.
- l. The policy is primary coverage and any insurance or self-insurance maintained by the Marshall County Fiscal Court shall be excess.
- m. Any failure of the named insured to comply with the reporting provisions of the policy shall not affect coverage provided to the Marshall County Fiscal Court, its officers or employees.



- n. Worker's Compensation and Employers Liability Coverage. The insurer shall agree to waive all rights or subrogation against Marshall County, its officers and employees for losses arising from work performed by the Contractor for Marshall County.
- o. All Coverages. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to Marshall County.

12. Provide proof of accreditation in good standing with the National Association of Energy Service Companies (NAESCO).

Our NAESCO accreditation as an Energy Services Provider is evidence of our ability to provide the full range of services required for a comprehensive energy efficiency project, including energy audits, design engineering, providing or arranging project financing, construction management, commissioning, operations and maintenance of energy efficiency technologies, and verifying energy savings. We consistently demonstrate our ability to design, develop, and implement turnkey, comprehensive energy efficiency projects, performance-based contracts and have proven our technical and managerial competence to design and implement projects involving multiple technologies.

Companies seeking *NAESCO-Accredited* status must apply to a committee of industry experts who are unaffiliated with any particular ESCO or any other company under consideration for accreditation, and undergo a rigorous examination of their core competencies and business practices. The committee carefully reviews the detailed documentation submitted and consults with selected customer references. The committee looks at criteria including the following: the precise nature of the applicant's business; the range of measures and services offered to customers; the availability of a performance-based project approach; ethical business practice commitment; project engineering and design, financing, project management, operations, and maintenance capabilities; and the capability of verifying and monitoring energy cost savings.



ESG is a nationally-recognized Energy Service Provider (ESP) accredited by the National Association of Energy Services Companies. ESG has over 23 years of experience conducting and providing guaranteed energy savings services through innovative solutions.



Certificate of Accreditation

This is to certify that

Energy Systems Group

has participated in the Accreditation Program and Review and has been recognized by the National Association of Energy Service Companies to be an Accredited Energy Service Provider.

Natasha Shah
Chairman

Terry E. Singer
Executive Director

June 2017

Certification of Accreditation covers a period of 36 months from date of issuance.

Accredited since 1999.



2.3. Company Qualifications and Approach to Project

C. Preliminary ESPC Project

1. Provide a description of the overall project recommended energy conservation measures including:
 - a. A list, by facility, of the proposed energy conservation measures.

Following is the preliminary list of measures by facility. The most successful projects are co-developed and we will need additional input from Marshall County to add, remove or investigate other measures once ESG is selected. While many measures were originally considered based on need, the payback or cost would not allow them to be included in the final recommended project. Further investigation could allow these measures to be included. As an example, fleet management could be included if the County was interested in pursuing this route; however, this measure was excluded because of what measures we understood to be priorities.



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Marshall County Fiscal Court Energy Conservation Measures Matrix

Category	ECM	Description					
			Detention Center	Courthouse	Judicial Center	Road Department	County Park
1.0 Lighting	1.1	Interior LED Lighting	X	X	X	X	X
	1.2	Daylight Harvesting Sensors			X		
	1.3	Occupancy Sensors		X			
	1.4	Exterior LED Lighting	X	X	X	X	X
2.0 Water	2.1	General Water Conservation Measures	X	X	X	X	
3.0 Controls	3.1	Retro-commissioning	X	X	X		
	3.2	Control System Expansion/Upgrade/Replacement	X	X	X		
	3.3	Vending Machine Controllers	X	X	X	X	X
	3.4	Occupancy Sensors for HVAC Setback		X			
	3.5	Variable Frequency Drives			X		
	3.6	Lighting Controls		X			
4.0 Building Envelope	4.1	Door Seals	X	X	X	X	X
	4.2	Wall/Roof Joint Seals		X		X	
	4.3	Window Film		X	X		
	4.4	Added Insulation/Insulation repair	X			X	
5.0 HVAC Upgrades	5.1	UV-C Lighting for Coil Cleaning	X				
	5.2	Boiler Replacement	X				
	5.3	Domestic Hot Water Heater Replacement	X				
	5.4	HVAC System Upgrades	X		X		
	5.5	Duct Sealing					
	5.6	Waste Oil Heater				X	
	5.7	Generator Replacement	X				
6.0 Laundry Improvements	6.1	Ozone Laundry System	X				
7.0 Utility Modifications	7.1	Meter Consolidation					X
	7.2	Sewer Credits for Cooling Tower			X		
8.0 Miscellaneous	8.1	Other Needs - TBD	X	X	X	X	X



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- b. Documentation of energy and operational savings by ECM. (Initial savings calculations shall be available upon request).

Energy and Operational Savings by ECM		
ECM	Energy Savings	Operational Savings
Lighting	\$50,563	\$4,140
Water Conservation	\$14,820	\$600
Controls	\$24,795	\$0
Building Envelope	\$6,750	\$0
HVAC Upgrades	\$7,200	\$400
Laundry Improvements	\$2,160	\$0
Waste Oil Heater	\$540	\$500
UV-C Lighting	\$533	\$50

- c. A brief technical description of each of the proposed technical measures and basis for energy savings calculations

ESG uses a proven development process to identify solutions and equipment that will provide the best value. All materials and products installed will meet strict quality and performance standards in order to ensure that the equipment maintains its optimal efficiency throughout the term of the contract. The average system life for each measure along with warranty information will be provided to the County upon final equipment selection, during the development of the final contract scope of work.

ECM 1.0 – Lighting Improvements

ECM 1.1 Interior LED Lighting

Quality lighting depends on more than just luminance levels. The direction, distribution, color temperature, and color rendering index of the source all contribute to effective lighting and visibility. Illumination levels are generally dictated by the needs of the visual task and are influenced by many factors such as details of task, reflectance and contrast (task and background), the eye (age and condition), and importance of speed and accuracy.

The light fixtures at Marshall County facilities use a variety of fixture types and ages. The older technologies that are present can be upgraded to more energy efficient technologies. Improvements to lighting will reduce electrical consumption and improve lighting levels, as well as reduce air-conditioning load requirements. The costs of material and labor to maintain the current systems will also be reduced since these renovations replace items that are typically near the end of their life cycle (i.e., lamps and ballasts).



LED fixture retrofit kits for Admin Offices can save as much as 30-70% of the electrical consumption from the lighting system.

LED Technology Retrofit and Replacement

The majority of the interior lighting throughout the facilities are 32-watt T-8 lamps and lower efficiency fixtures. ESG will investigate the financial impact of installing LED lamps and new LED fixtures. LED technology has greatly improved over recent years and has made strides in regards to the financial feasibility of the implementation of LED solutions. The rated operating life of LED fixtures also leads to successful implementation in areas that have



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increased maintenance costs for repairs. LED fixtures will be targeted in areas with significant run hours, such as hallways, or areas that are difficult to gain access for maintenance.

Additional financial opportunities will be investigated, such as utility incentives and rebates. The incentive dollars can be utilized to enhance the value proposition of LED solutions.



Typical LED tubes used to replace fluorescent lamps can reduce inventory costs, maintenance expenses and provide long life cycles.

Guide for Typical Lighting Improvement

Existing Technology	Recommended Technology	Considerations
T-12 fluorescent lamp with magnetic ballast	Relamp with LED tube and new ballast – OR – Retrofit with LED fixture – OR – Relamp with direct-wire LED tube	Due to possible hazardous materials, magnetic ballasts will be properly disposed
T-8 fluorescent lamp with electronic ballast	Relamp with LED tube – OR – Retrofit with LED fixture– OR – Relamp with direct-wire LED tube	Existing ballast remains, depending on efficiency and age
T-5 fluorescent lamp	Relamp with LED tube – OR – Relamp with direct-wire LED tube	Efficiency and rated life cycle does not typically justify a replacement or retrofit
Incandescent bulb and Compact fluorescent	Relamp with LED bulb	N/A
High bay fixtures	Retrofit with LED high bay fixtures	Light levels and distribution are critical in the design of these types of fixtures
Exterior high intensity discharge (HID)	Retrofit with LED fixture	Typically exterior lights will be replaced with new fixtures

ESG proposes to replace all linear fluorescent fixtures with direct-wire LED Tubes. Poles and floods will be replaced with new fixtures at Mike Miller Park. The 6", 8", 9", and 10" can lights will be retrofit with new LED can retrofit kits. Wall-packs will be retrofit with LED lamps or replaced with new wall-packs as necessary. Screw-in lamps will be retrofit with new LED screw-in bulbs.

ECM 1.2 Daylight Harvesting Sensors

Daylight harvesting takes advantage of available daylight to augment electric lighting systems. Taking advantage of the natural daylight features of the building architecture can produce considerable electrical savings. Dimming ballasts and/or LED fixtures working with digital photo sensors can reduce electric lighting loads proportional to the amount of daylight that enters the space. The more usable daylight entering the space, the more the electric lights can be dimmed or even shut off, resulting in significant energy savings. One example of an area that could use this ECM is the Judicial Center lobby where lights were operating unnecessarily. This was not included in the project at this point.



Typical Daylight Harvesting Sensor, for indoor ceiling mount



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ECM 1.3 Occupancy Sensors

Lighting is the most visible electrical system and one of the largest electricity users in a building, accounting for as much as 50% of the electrical energy use in existing buildings and 30% of use in newer buildings that meet the ASHRAE/IESNA 90.1 standard. According to the New Building Institute, advanced lighting controls can reduce lighting energy consumption by up to 50% in existing buildings and at least 35% in new buildings.

Pairing LED solutions with intelligent controls that allow for dimming, daylight harvesting and occupancy based control will eliminate the problem of over-lighting areas and can help reduce overall operating expense. ESG will investigate the control of lighting systems in low-occupied zones or areas that may be subject to over-lighting, such as offices or common areas. The deployment of data loggers to capture how/when relevant spaces are utilized will provide a baseline for reducing runtime of lighting systems. ESG will also gather lighting power density data in areas throughout the facility to determine areas that exceed industry energy standards.

Where possible, the lighting controls will also be integrated with local HVAC controls. These controls will be used to initialize a temperature setback sequence when the building is in unoccupied mode. They will also be used to modulate the ventilation air where possible.

ECM 1.4 Exterior LED Lighting

LED technology will also be investigated for the improvement of safety and maintenance resourcing. LED lamps, with their extended life cycle rating, are ideal for exterior applications and emergency lighting systems. ESG will investigate the implementation of LED lighting retrofits to security lighting and parking lots throughout all sites. ESG will make every effort to maintain a consistent fixture type for all pole mounted exterior fixtures.

ESG also investigated the lighting at Mike Miller Park. Maintenance staff mentioned that since the ballpark lighting is at an unreachable height, the staff waits until many bulbs burn out before renting a lift tall enough to change out the bulbs. LEDs would help significantly, as many LED ballfield lights can last for over 20 years without service. ESG investigated this option, but due to the expense and the necessity to use as much funding as possible for the Detention Center, this was not included in the project.

Instead, ESG chose to try to include the street lighting in the park. In this proposal, ESG has included the cost to replace the fixtures with new, LED fixtures. ESG would reuse the existing poles to do this.



Various styles of occupancy sensors can be investigated for many different locations and applications



Typical exterior LED fixtures provide long life with reduced maintenance cost



ECM 2.0 – Water Conservation Measures

ECM 2.1 General Water Conservation Measures

Toilets and Urinals

The United States uses about 4.8 billion gallons of water every day to flush waste. Since toilets and urinals account for nearly one-third of building water consumption, the potential for savings in this area is significant. Except for in relatively new or recently refurbished facilities, toilets and urinals consume too much water. Current Federal law requires that commercial toilets use no more than 1.6 gpf (gallons per flush) and urinals must use no more than 1 gpf. Infrared or ultrasonic sensors can be used to automatically activate flushing, making it unlikely for users to flush twice. Potential improvements include replacing high volume toilets with new 1.28 gpf ultra-low flow units and installing dual flush handles on existing 1.6 gpf toilets. These dual flush handles will allow the toilets to flush at a rate of 1.1 gpf for liquid waste and a full 1.6 gpf for solid waste. Urinals will be investigated for upgrading to 0.125 gpf units.

In the case of the Detention Center, ESG will collaborate with the Marshall County to determine the best option for the amount of water used per flush in the stainless fixtures. While 2.5 gpf valves can be installed, this can be worrisome for maintenance staff since they are used to longer flushes being required to clear the bowl. This will be one area of discussion during full development.

Faucets and Showerheads

Tremendous amounts of water and energy are wasted using inefficient faucets and showerheads. Current regulations require that lavatory, kitchen faucets and aerators use no more than 2.2 gpm (gallons per minute) while showerheads must use no more than 2.5 gpm. Appropriate conservation measures could include:

- Install showerheads that achieve the 2.5 gpm or less flow rate.
- Install aerators or laminar-flow devices on faucets rated at 0.35 gpm for hand wash sinks and 2.0 gpm for breakroom faucets. Faucets such as kitchen wash basins or janitor closet sinks will not be regulated due to their required high volume use.
- Install automatic shut-off valves operated by infrared or ultrasonic sensors, which detect the presence of someone's hands and will shut off water when the hands are removed.

In this proposal, ESG has included the cost to install new showerheads and flush valves at the Detention Center, which will significantly reduce water usage. ESG has also included fixture/valve replacement for certain fixtures at the Courthouse.



The best options to upgrade the amount of water used and flush valves in the stainless units at the Detention Center will require input from staff.



ECM 3.0 – Controls Improvements

ECM 3.1 Retro-Commissioning

Controls retro-commissioning is a performance enhancing strategy that is performed on facilities. It consists of performing a functional test on all existing DDC control points to verify that each control point is communicating properly and that the mechanical equipment is responding to the controls. This will include verifying communication from the controls workstation to the terminal control components, accuracy of sensors, function of valves and dampers, and verifying all points are represented on the workstation. This will also include a review of the programmed sequence of operations. If any modification to the sequence of operation is required, we will coordinate the appropriate programmer to make the necessary changes. Items that may be uncovered could include buildings not utilizing night setback or not minimizing the outside air damper when the building is unoccupied.

The retro-commissioning process may uncover deficiencies that will increase the utility costs; such as outside air dampers that have been permanently closed off or the lack of outside air being brought into the building. ESG will make baseline adjustments to include this new energy use that should have been part of the baseline. Other instances may identify deficiencies that will result in a positive savings; such as, a control valve that is leaking, dampers that will not fully modulate, or systems operating 24-7. These repairs will generate savings that can be applied to the project.

Calibration of temperature sensors can also impact savings. ESG will use various survey equipment to determine the actual room temperature. The space temperature sensor / thermostat will be recalibrated if it is reading more than 2°F from the actual room temperature.

ECM 3.2 Control System Expansion / Upgrade / Replacement

ESG identified several control systems that are in need of upgrades of some kind.

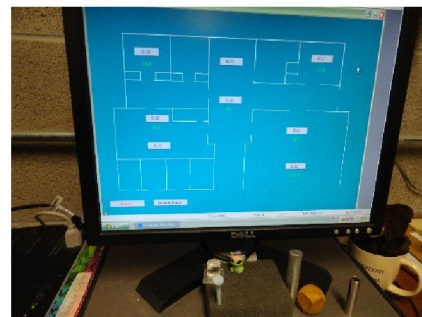
Occasionally we will discover that the existing control system, while older and limited in capabilities, is being utilized to its maximum potential, leaving limited savings available for a modern control system. In this instance we will investigate the financial impact of upgrading the front end with an open protocol system that is capable of using customized drives to pull in existing control points and maintain existing system functionality. This upgrade will provide the end user with the option to remotely access the new front end, as well as setting up trends, alarms, and further optimizing the existing controls capabilities.

Energy Management System

A centralized Energy Management System (EMS) that ties all the existing control systems together will be an important key to achieving and maintaining energy savings. This system will provide much greater ability to plan and control energy use. These centralized systems are designed to provide communication to each building allowing maintenance personnel to monitor and control critical equipment necessary for the operation of comfort control in the buildings. Some key features of the Energy Management System are:

Global Monitoring and Control

A Direct Digital Control (DDC) system provides an enhanced mode of monitoring and control for the system user. The Operator Workstation is a window into each building. System information is communicated not only among control units but is also transmitted to a central monitoring station. Important information, such as room and duct temperatures, room set points, control parameters, and alarm limits, can be adjusted from a remote



The control system interface at the Detention Center and Judicial Center will be updated to ensure proper operability and enhance performance



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location. This allows comfortable and efficient control of a building and provides immediate notification of malfunctions and discomfort. In addition, detailed trends and records of building performance can be kept.

Resistance to Tampering and Vandalism

Electronic temperature sensors are less sensitive to abuse than pneumatic thermostats and present a less inviting target for tampering since there are no visible means of adjustment. Set points and control parameters are sealed and adjustable only with the proper tools by trained personnel. This ensures that comfort levels are maintained at all times and are not compromised by tampering or misuse. The sophistication of the system also provides immediate notification of any damage or breakdown of the DDC components.

Solid-State Reliability

Sensors, controllers, and communications are all electronic and interfaced, to proven and reliable electronic actuators. After initial break in, these systems rarely malfunction and are less susceptible to calibration drift than pneumatic controls.

Control Flexibility

A digital control system allows a new level of control flexibility and sophistication, which was not practical with pneumatic and electrical controls. Some of the benefits available with DDC are: occupied/unoccupied modes, optimized warm-up and cool-down sequences, interface with cooling and heating plants, and intelligent response to system problems.

Upgrading an existing Energy Management System for a facility could provide additional HVAC unit control to increase comfort and improve efficiency. Older controllers will be replaced with new DDC controllers to enhance existing operation as well as provide additional equipment scheduling, monitoring and control strategies. A new Operator Workstation will provide a graphical front end and remote access to all major pieces of equipment. Upgrading the existing heating and ventilation control systems would provide the following capabilities:

- Direct Digital Control of individual buildings and mechanical equipment rooms, which could include boiler enable control, circulating pump control, supply and return water monitoring, temperature reset, equipment status, alarming/notification, and history/trending capability.
- Direct Digital Control of chiller equipment, which could include chiller enable control, circulating pump control, supply and return water monitoring, equipment status, alarming/notification, and history/trending capability.
- Direct Digital Control of terminal HVAC units, which could include optimal start/stop; night setback; status; alarm notification; discharge air temperature control; and supply, return, and zone temperature monitoring.

ESG has included costs in this project to upgrade the Judicial Building and the Detention Center to the latest software package and to review the control points, sequence of operations, and setback/setpoints to ensure the building is operating as efficiently as possible. ESG has also included the cost to install a new control system at the Courthouse which will allow for greater control of the building than is currently available.



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ECM 3.3 Vending Machine Controllers

A Vending Miser is installed on vending machines that do not contain perishable goods. A passive infrared sensor is mounted to the vending machine. This sensor detects movement around the general area of the machine. If after a set time period, no movement is detected, then the Vending Miser moves into a standby mode of operation.

In standby mode the machine is basically powered down. The display lights are disabled and the refrigeration compressor is taken off-line. The Vending Miser unit then monitors the ambient conditions and periodically engages the compressor to keep the product at a usable temperature. Cycle time is based on ambient temperature, meaning that the warmer the ambient temperature, the more the unit will cycle in standby mode. The Vending Miser has an intelligent controller that uses “fuzzy” logic to reset the time-out periods according to historical building occupancy.



Vending Machine Controllers provide energy savings by reducing lighting and compressor run times.

The Vending Miser also measures the machine’s current draw so that it will never put the machine in standby mode when the compressor is operating; which would eventually damage the compressor because it would restart under high head pressure.

Field test results show an average electrical savings of nearly 46%. The Vending Miser will actually increase equipment life because the compressor cycles fewer times per day.

ESG will install Vending Machine Controllers in select locations throughout the buildings included in this project.

ECM 3.4 Occupancy Sensors for HVAC Setback

This improvement measure is targeted for rooms that will receive an occupancy sensor from the lighting upgrade project. Lighting occupancy sensors will be installed with a ceiling or corner wall mount sensor and will be supplied with a set of dry contacts. This set of contacts will be integrated into the HVAC terminal unit controller and will let the direct digital control (DDC) system know that the room is un-occupied. This setup allows for further efficiency gains by implementing an “occupied standby” sequence based on actual occupancy. When a courtroom, conference room, meeting space, etc. is scheduled to be in occupied mode (normal occupancy hours) and is not being utilized, energy is being wasted by conditioning the space to occupied temperatures and supplying unnecessary ventilation air. The reduction in ventilation air can be accomplished by closing outside air dampers on unit ventilators, fan coils, or single zone air handling units. Reducing ventilation air can also occur by changing the minimum damper position on VAV boxes to zero airflow, and only opening the damper when space cooling is required. This control sequence will additionally adjust the space temperature set point. The adjustment will not be drastic, as the HVAC system will have to recover quickly when the room becomes occupied. The actual setback temperature will range from 1°F to 4°F and will be “dialed in”, based on the recovery time for each particular space. Once the space becomes occupied, the occupancy sensors will alert the DDC system to return back to normal occupancy conditions.

The Courthouse and Judicial Building both would be good candidates for this opportunity. During full development, this measure will be further investigated and results will be presented to Marshall County detailing the benefits of the measure.

ECM 3.5 Variable Frequency Drives

Variable Frequency Drives (VFDs) are devices that are installed on motors, which change the speed of that motor based on a control signal. VFDs are commonly found on air handling unit fans, pumps, cooling tower fans, etc... The speed of the motor is modulated by changing the voltage of the power that is delivered. This is much more



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effective and efficient than “choking” the motor with dampers, vanes, or valves. ESG will investigate the opportunity to install VFDs on various air handling and water distribution systems.

The principal advantage of a VFD is the significant energy savings realized from reduced horsepower required as flow rate is decreased to match decreased loading conditions. The VFD saves energy at a cubed rate; therefore, even a small (20%) reduction in the pump's speed translates into large energy savings (50%).

VFDs will be applied to the Judicial Building's cooling tower pumps in this proposed project. By opening the triple duty valves that are in place and allowing the VFD to modulate the pumps, significant savings can be achieved.



ECM 4.0 – Building Envelope Improvements

ECM 4.1 Door Seals

Poor or missing door seals can lead to air leakage, especially if the building is under negative pressure. The selected door seals will carry a material warranty (no labor) for the life of the door. The door sealing material consists of a heavy metal aluminum carrier with strips of angled sponge wrapped in vinyl. It is applied with screws and caulked with a UV resistant 50-year warranty caulk, for added durability and air sealing. The door sweeps utilize a double fin film seal between a set of brushes. This system is also embedded in a heavy aluminum carrier. It is installed under the kick plate of the door with screws and long life caulking.

This measure is included in the proposal for all buildings listed in this response. During full development, ESG will investigate the effectiveness of this measure at the other sites listed in the RFP that were not to be included in the response.

ECM 4.2 Wall / Roof Joint Seals

In addition to missing door seals, roof and wall joints are another source for air infiltration. The sealant used at the roof/wall joint will be a one part or two part foam depending on the size and configuration of the gap. The foam seals will have an estimated 25-year life expectancy, as long as they are not exposed to UV-A or UV-B rays. Larger areas that need sealed will use insulation board to bridge the gap and then foam sealant will be used around the perimeter.



Example of the addition of insulated materials with foam sealant used to prevent uncontrolled air infiltration at KCTCS Owensboro.

The Courthouse and Road Department will receive some amount of this measure based on each building's need. There were many areas observed during the initial walkthroughs that could use this measure.

ECM 4.3 Window Film

Single pane windows allow for the transfer of both radiant and convective heat. Where replacement of the window is not achievable, the radiant heat loss can be reduced by installing window film. The film is installed to the interior face of the glazing and will reduce solar heat gain in the summer and heat losses during the winter. It is also possible to use an exterior window film, when access to the interior of the window is difficult or dangerous. The film will save energy by reducing the thermal loads on the facility and reducing the operating hours of the heating and air conditioning systems. Typical installation of window film will be on west and south facing exposures; however, certain building orientations and architectural features may require window film to be installed on multiple exposures of a building. We will note any failed window seals and/or broken panes. This list will be discussed with the owner, and a plan of action will be determined, prior to the film installation. It is important to note that the metal content in the proposed window film, may disrupt weak cellular signals in the building.

ESG has included this measure for both the Judicial Building and the Courthouse.

ECM 4.4 Added Insulation/Insulation repair

Missing or damaged insulation reduces the building's ability to maintain a desired temperature especially when there is a large gap between exterior temperature and desired internal temperature. This results in HVAC equipment running longer hours and at a higher demand. Adding or repairing insulation will decrease the rate of heat transferred between indoors and outdoors. An added benefit can be infiltration reduction, as the insulation will not only act as a conductive barrier but also a convective barrier. Adding insulation to existing structures can be difficult depending on the type of insulation used and access to wall cavities and exterior surfaces.

ESG discovered missing insulation in certain areas of both the Road Department and Detention Center. This measure was included for select areas of these buildings.



ECM 5.0 – HVAC Upgrades

ECM 5.1 UV-C Lighting for Coil Cleaning

This ECM typically will be applied to large air handling systems and smaller systems with long run hours. The majority of the existing air handling units (AHUs) use standard filters to remove dirt, biological, and other contaminants from the air. While the existing filtering system adequately cleans the air, some airborne debris continues to either pass through the system or bypass the filters. This debris can be biological and, when collected on a wet cooling coil, can reproduce. Several issues may result. Biological contaminants can spread throughout the AHU's distribution system, which may cause a building to become sick. Airflow through the coil can also be restricted, which will cause the air handling systems to operate for increased periods of time in order to achieve proper conditioning in a space.

Ultraviolet radiation (UV-C) light emitters can significantly reduce the biological contamination in the air stream keeping the building healthy and minimizing the spread of viruses and bacteria. UV-C will also irradiate dirty air handling system components to deactivate microorganisms in the coils and drain pans. The UV-C light will rapidly clean these surfaces and penetrate between the coil fins to clean within the coil. The objective of this coil cleaning is to remove the microbiological contamination resulting in reduced pressure drop across the coil and improved thermal transfer, thus improving the system's energy efficiency. Properly applying UV-C light to a contaminated coil will bring the coil back to its original as-built condition over time. Proper application involves not only flooding the coil surface area that is in direct view of the UV-C lights, but also measuring the transmission of that light on the backside of the coil. This process ensures that the lights are properly positioned and that a sufficient amount of UV-C light is being applied.

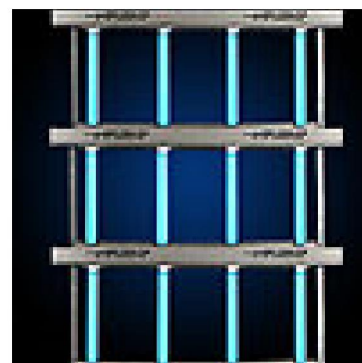
The proposed germicidal UV-C light emitters will continuously clean the biofilm from the cooling coils. Energy transfer in cooling coils has routinely been documented to increase from 15% to 20% when UV-C lights are used.

The UV-C lamps are constructed quartz or soda barium glass, which transmits UV-C light. Typical fluorescent lamps are made of common glass and will filter out this wave length. The UV-C lamps are tuned to provide radiation at 253.7nm wavelength, which is most effective at deactivating microorganisms. The application of the lamps will play a factor in how often they are changed. If the UV-C system is installed specifically for indoor air quality reasons, then the lamps should be replaced every year. If the system is designed to keep the AHU coils clean, then the lamps can be replaced every 2-1/2 to 3 years. Even after three years of service, the lamps will be generating visible light; however, the quartz will have degraded and will block a significant portion of the UV-C radiation. In order to extend the lamp change-out periods, ESG will initially oversize the system. The UV-C lights should be operated continuously in order to provide proper coil cleaning and to prevent the growth of microorganisms.

Proposed systems that will use four (4) UV-C emitters (lamps) or more will also receive a radiometer that will monitor the quantity of UV-C light being generated. This device can be integrated into the building management system such that an alarm can be given when the UV-C light production drops below a minimum threshold. This system can also be used to identify electrical issues that may have disabled the UV-C system. The UV-C lamps and ballasts



*UV-C Light Installation at the
Kentucky State Capitol Annex*



*Proposed Rack Type System for
UV-C Lights*



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selected by ESG are non-private branding and are readily available for purchase from any number of lighting suppliers allowing for ease of future replacements.

ESG has included the installation of UV-C lamps in the new AHUs that will be installed at the Detention Center. This should not only help with the required maintenance of the units, but also help to keep the air quality cleaner and everyone in the building healthier.

ECM 5.2 Boiler Replacements

Several buildings use gas-fired hot water boilers to produce hot water for building heat. ESG will focus on the existing gas fired boilers that are at or nearing the end of their useful life, hot water systems that can be upgraded with new technology, and electric boilers where natural gas is now available. In the proposed project, the three (3) boilers at the Detention Center will be removed and two (2) new boilers will be installed in their place. These new boilers will be sized appropriately to maintain the domestic water system as well as the building loop. The second boiler will be redundant, in case the first is in need of service at any time.

Boiler selection is dependent on several variables. Replacing every boiler with a condensing boiler will not guarantee significant energy savings. If the existing hot water system is designed around 180°F hot water, as is the Detention Center, then the coils and piping are also sized using this design parameter. When this is the case, a condensing boiler will not operate in the temperature range where it is most efficient. For this application, which is typical of many retrofit projects, a high efficiency (85%) standard boiler would be a better choice. The high efficiency standard boiler is approximately half the cost of the condensing boiler and will generate nearly the same savings potential.

In a retrofit situation, condensing boilers will work best in applications where the hot water is required to operate year-round for de-humidification or reheat coils in VAV boxes. Another application where condensing boilers are a good fit is in a water source heat pump system, where the condenser water temperature is maintained around 85°F.



The existing boilers at Detention Center will be replaced with new boilers installed to maximize efficiency

ECM 5.3 Domestic Water Heater Replacement

Domestic water heater replacements are targeted in buildings where hot water demand is high and the existing water heater is either electric powered or standard efficiency natural gas-fired. We typically recommend installing a condensing tank-type water heater, or using a condensing boiler with hot water storage tanks, for large capacity systems. The temperature range that domestic hot water systems operate within is well suited for condensing technology.

The Detention Center will be the key installation relating to domestic water heating. The existing system generates hot water to ~150 degrees for use at the kitchen. It also uses the higher temperature in the domestic application of showers and sinks for the inmate populations, however it is mixed with city utility water to bring the temperature to approximately 110 degrees. ESG proposes to install two new domestic hot water tanks in place of the existing one: one for kitchen use (supplied between 140 and 150 degrees), and one for use at showers and sinks (supplied at 110 degrees). Separating the kitchen and shower/sink water will allow energy savings in two ways. Currently, the 140 degree water is mixed down to 110 degrees after already having been heated up to 140 degrees. This is an unnecessary loss in energy that we can eliminate using this method. The second area where savings can be achieved is in the elimination of the large hot water storage tank. While the current tank is insulated, heat loss still occurs over time. With such a large amount of hot water, those losses can be significant. Installing the two new hot water heaters will allow for the storage of less water and, therefore, eliminate overall heat loss in the system. This new storage capacity will be analyzed during full development to confirm there is enough hot water available to meet the needs of the building.



ECM 5.4 HVAC System Upgrades

ESG will evaluate each building's HVAC system and recommend financially responsible ways to improve performance and/or replace the entire system. Older systems, such as constant volume reheat systems, provide excellent comfort; however, they are very energy intensive. Retro-commissioning, which is described in the controls section, is also applicable for the HVAC equipment where verification of functionality can improve both comfort and reduce energy consumption. The possibilities for improvements are extensive. A few examples are listed below.

Demand Controlled Ventilation

Demand Controlled Ventilation is a control sequence that utilizes readings from a CO₂ sensor to adjust the amount of ventilation air being brought into a space. Typically, ventilation air dampers are set at a minimum position. On a typical HVAC system, this corresponds to a ventilation air damper position from 10% to 25% open. Demand Controlled Ventilation can reduce this minimum position to a point where only enough ventilation air is being brought into the building to make up for exhaust fans in restrooms or janitor closets. With Demand Controlled Ventilation, if the area being served only has a few people in it, then the ventilation air damper may not move from the new minimum position. Conversely, if the space is full of people, then the Demand Controlled Ventilation system will modulate the ventilation air dampers to maintain a maximum CO₂ set point. Demand Controlled Ventilation will save energy by reducing the outside air intake requirements of the HVAC system and will also improve the space environment by ensuring proper indoor air quality. In addition to Demand Control, Occupancy Sensors can be integrated into the controls that limit operation of both the HVAC and lighting, based on room occupancy.

Economizer Controls

Economizers save energy in air-conditioning systems by using outdoor air for "free" cooling. An outdoor air sensor provides input to determine if the outdoor air is suitable for cooling. A sensor that responds only to temperature provides dry bulb control input. A sensor that responds simultaneously to both temperature and humidity provides enthalpy control input. Enthalpy is a measure of the total heat content of air. It is directly related to the amount of energy needed to mechanically cool a quantity of air. When these conditions are favorable, outside air alone is used to provide space cooling. This saves considerable amounts of energy by allowing the chiller to be shut down.

AHU and Condenser Replacement

Over time, AHUs become less effective at moving air through a system. They begin to develop mechanical issues and require a large amount of attention from maintenance staff. The condensers for these AHUs also begin to have issues: they become less effective at rejecting heat. This occurs not only by coils becoming dirty from exposure to outdoor air, but also due to physical damage incurred by the weather in the area. At the Detention Center, ESG observed that many AHUs and condensers are at the end of their useful life. They are requiring extra attention from maintenance staff and are in need of replacement. After speaking with the Marshall County staff, ESG prioritized these HVAC upgrades over all other possible HVAC upgrades (such as the Courthouse units) to ensure the Detention Center maintenance costs go down and the building can operate as it was intended. ESG has included the replacement of six AHUs and their corresponding condensing units in this project. ESG has also included hail guards to protect these new units from the same damage that was observed in the units being replaced.

ESG also was informed of issues that have been arising with the cooling tower at the Judicial Center. The PH balance has deviated from the intended values and has caused damage to the tower. This tower was already in the process of being repaired during the walkthroughs for this project. ESG realized that while the tower repairs are necessary, the heat exchanger for the cooling tower has likely also suffered from the effects of this PH imbalance. ESG has included the cost to clean the cooling tower and its heat exchanger in the proposed project.



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ECM 5.5 Duct Sealing

ESG recommends the use of a process of sealing the ductwork from the inside for air handling systems that use ducted returns. This process uses a polymer product that is atomized into an airflow and travels to the duct leak. Once it reaches the point of duct leakage, the polymer particles begin to collect and seal the leak. In its final form the product takes on the consistency of a tacky, rubbery substance. The final product is nontoxic and will not deteriorate over time.

The installation process involves blocking off all terminal units (diffusers, variable air volume boxes, reheat coils, etc.) and the AHU. A fan is then attached to the ductwork and a pressure test is taken to determine the quantity of leakage before the system is sealed. As the polymer product is injected into the duct, a computer continuously monitors the leakage rate and reports it to the operator. When the leakage rate indicates leakage resolution, the operator will discontinue injecting the polymer solution into the duct and will use the fan to purge the ductwork of any excess. A report of the results is generated from the computer terminal showing pre- and post-results and calculated energy savings.



Duct sealing is conducting using a polymer product to fill leaks. The sealant is visible in the lettering on the metal plate shown above.

ESG considered this measure for the Detention Center mainly, but more investigation would need to be completed before inclusion in the project would be possible. This measure is not currently included in the proposed project.

ECM 5.6 Waste Oil Heater

ESG recommends installing a waste oil heater at the Road Department. This technology utilizes used motor oil that is currently being recycled. This oil is a viable fuel source that can be used to provide supplemental heat to the garage bay.

A typical sized unit will consume less than 2.5 gallons of used oil per run hour. The recommended system will be able to be connected to ductwork for improved heat distribution. In addition, we recommend the installation of a 250-gallon oil tank, which will include all necessary components to complete the system. The used oil collected throughout the year should be able to fire the waste oil burner for the majority of the heating season.

Preventive maintenance on this type of system is minimal. The combustion chamber of this unit is designed for quick access so that the ash can be removed easily one time per heating season.

Marshall County staff informed ESG that the County currently pays to have the oil hauled away for recycling. Implementing this measure would eliminate that fee and, therefore, result in additional savings for the County.

5.7 Generator Replacement

In speaking with maintenance staff, ESG discovered that the generator used for powering the Detention Center in emergency situations has been in need of replacement for a long time. It is at the end of its useful life, and has required significant maintenance. ESG has included a new generator in the proposed project.



ECM 6.0 – Laundry Improvements

ECM 6.1 Ozone Laundry System

ESG proposes the installation of an ozone laundry system for the wash water used in the laundry of the Detention Center. Ozone is a very strong oxidizer that allows the existing equipment to use less detergent in many cases, allows the use of lower water temperature, and greatly extends the life of fabrics. It also provides excellent sanitation as required for correctional facilities, killing 100% of viral pathogens and also the MRSA bacteria (antibiotic resistant staph infection) which is very prevalent in correctional populations.

This measure has been included in the proposed project. A wall mounted ozone generator will be installed in the main laundry room of the Detention Center and interconnected with the existing laundry equipment.



An ozone laundry system will be installed to reduce hot water requirements and protect linen life

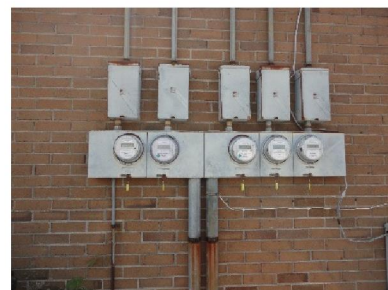
ECM 7.0 – Utility Assessment Improvements

ECM 7.1 Meter Consolidation

Meter consolidation is appropriate when several utility accounts are physically located within a reasonable distance from one another. Each utility account, regardless of the utility, is provided with a customer charge. When accounts have low consumption, the customer charge can have a significant impact. By consolidating these meters to a single meter, the multiple customer charges can be eliminated.

Meter consolidation can also have benefits based on the increased consumption and shifting to decreased costs based on utility rate structures. ESG has the expertise to provide the analysis and determine feasibility of consolidating these meters.

ESG intends to further investigate the viability of this measure for Mike Miller Park, as there are many electric meters at this location and possibly many minimum charges being unnecessarily incurred.



Multiple electric meters that can be consolidated to a single electric meter

ECM 7.2 Sewer Credits for Cooling Tower

Sewer costs can have a significant impact on the overall water utility expense. Some credits can be applied to water meter accounts for water use that is not sent to the sewer utility. Makeup water for cooling towers is an example of applications that can be reconfigured to have a credit applied. ESG will investigate the installation of a deduct water meter on the makeup water line to the cooling tower. The deduct meter will allow sewer savings to be calculated and applied to the overall water expense.

ESG has included the cost of this measure and the calculated savings in the proposed project. Further investigation will be required to determine if this measure is the best fit for the County and whether the utility will allow this meter to be installed and read.



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ECM 8.0 – Miscellaneous

ECM 8.1 Other Needs - TBD

Through our performance contracting program, ESG can provide solutions for other County needs. Through extensive discussions with your representatives, we can provide technical assistance and the financial means to meet these needs. The program is open to inclusion of many items which would require further investigation. Measures that ESG believes might be of benefit to the County, but we were unable to include currently, was security cameras for the sheriff's office/911 area, roof replacement at the Courthouse and kitchen equipment replacement at the Detention Center.



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2. Provide information on the company's planned use of existing systems and equipment as part of the proposed energy conservation measures.

During initial site visits, ESG met with many members of Marshall County Fiscal Court staff. It is through these conversations that ESG has prioritized the preliminary projects funded by energy savings.

County personnel indicated the Detention Center HVAC equipment has many issues. ESG discovered many units that either were at the end of their useful life or were in need of replacement due to constant repairs. After further discussions with Marshall County staff, ESG then prioritized these needs at the Detention Center over all others. The existing system at the Detention Center will receive six new AHUs and condensing units as direct replacements. This building will also receive three new boilers to replace the boilers that have been mentioned as a major maintenance problem. ESG will also replace the 500-gallon hot water tank with a new, more efficient storage system which will require significantly less energy to fulfill the Detention Center domestic hot water needs.

ESG is also proposing to upgrade the current controls system at the Detention Center to the newest software package. This will keep the controls at the jail up-to-date and allow better functionality for maintenance staff.

The Courthouse will receive a new DDC system, which will allow for scheduling and setback capabilities. This new system will be web-based and maintenance staff will be able to access systems off-site when they desire to monitor and change set points and schedules. This allows for more control of the building and, ultimately, greater savings for the County.

While many HVAC units at the Courthouse are at the end of their useful life and are in need of replacement, this project was unable to support the cost of these units on energy savings alone. Many of the Courthouse units will need replacement in the next five years.

The Courthouse roof has reached the end of its useful life. In investigating this measure, ESG deliberated between using three different types of roofing material: a modified roof, a thermoplastic membrane, and thermoset membranes (such as EPDM). A modified roof, while the strongest and most durable, was significantly more expensive than an EPDM or a thermoplastic membrane such as TPO. The EPDM roof option is the closest to aligning with the County's needs and carries a warranty that will exceed the term of the contract, but due to its expense and the prioritization of the Detention Center HVAC equipment, the roof is not included among the viable projects.

ESG proposes to install WIFI communication thermostats on the HVAC systems at the Road Department. Remote access to the thermostats will allow the facility director the ability to implement occupancy schedules that closely fit the needs of the facility.

At Mike Miller Park, ESG proposes to install WIFI thermostats at the concession stands. This will allow for night and unoccupied setbacks at these locations.

The ballfield lighting at the County Park was a concern of the maintenance staff. Outside contractors maintain the pole lights, since the County does not have a lift that is capable of reaching them. Due to this ongoing expense, maintenance staff choose to wait until several bulbs are out before renting a lift or hiring a contractor. ESG investigated new ball field lighting for Mike Miller Park. Due to the priorities mentioned previously for the Detention Center, the project excludes ballfield lights.



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The Judicial Center has a DDC system that ABC installed many years ago. County staff are currently utilizing this system and its capabilities. ESG will upgrade this system to the newest software package and adjust set points to increase savings.

The Judicial Center also has a cooling tower. The cooling tower has continued to deviate from the recommended PH level causing unnecessary damage. CMI is currently servicing the tower to repair some of the damage that was caused by this issue. Due to this issue, ESG is including the cleaning of the cooling tower heat exchanger in our proposed project. This is necessary because, over time, the incorrect PH can cause the heat exchanger to grow scale or have other problems that can prevent proper heat transfer between the cooling tower and the building water loop.

ESG is proposing to improve the cooling tower system by adding Variable Frequency Drives, VFDs, to the two 15 hp cooling tower pumps. Currently, the pumps are set to run at 100% capacity, but the valves controlling flow have been adjusted to only allow up to 20% of the flow through. Installing VFDs and opening the valves to 100% will increase savings significantly by allowing the pump motors to slow to only what is required by the cooling tower.

3. Provide information on the company's proposed savings with regard to Operations and Maintenance and how those savings were determined.

County personnel provided documentation explaining the costs associated with certain contractors employed by the County. During analysis of this document, ESG discovered it could claim few of the costs. The County performs much of the work in house at low cost, which is a testament to the capabilities of the County maintenance staff and those responsible for budgets. Lighting material savings, plumbing material savings, and small HVAC maintenance items attribute to most of the Operations and Maintenance savings claimed. While the documents provided gave minimal granular detail, lighting material and plumbing materials are usually easier to quantify. These two types of costs only require researching the cost of tubes, ballasts, bulbs, fixtures, valves, etc. Since there are no breakouts for hardware store visits or other similar stocking trips, a small estimate is included for HVAC repairs. ESG also included conservative estimates for operational savings of UV lighting installation, as this reduces the maintenance cost for coil upkeep. Maintenance savings were also claimed for the waste oil heater, as this measure will eliminate the cost of having the waste oil recycled. This value was estimated as there was not a line item labeled for this pickup in the operational costs provided. These amounts totaled to \$4,140 for lighting, \$600 for water parts, \$400 for HVAC parts, \$50 for UV lighting coil maintenance savings, and \$500 for the elimination of the waste oil pickup.



2.3. Company Qualifications and Approach to Project

D. Services

1. Provide information on proposed maintenance and training services for the new systems and equipment proposed in the aforementioned ECM's.
 2. Provide detailed description of the recommended Measurement and Verification (M&V) Plan for measures with savings guarantees as required by KY 45A.352 (2) (a.).
 3. Provide the estimated costs of annual reconciliation statements and any required on- going services.
 4. Indicate any equipment maintenance service contracts and their costs which will be required by your firm as a condition of the energy services guarantee.
-
1. Provide information on proposed maintenance and training services for the new systems and equipment proposed in the aforementioned ECM's.

Maintenance Responsibilities of ESG and Marshall County

Once an energy conservation project has been completely installed and commissioned, it will be the responsibility of the facility maintenance staff to provide the required preventive maintenance and upkeep of the new systems. If a warranty concern should arise, the facility maintenance staff should first try to resolve the problem with the manufacturer. However, if this fails to result in a satisfactory resolution of the problem, ESG will assist in the resolution of equipment performance issues.

ESG's Measurement and Verification (M&V) department receives monthly statements from utility providers and monitors the progress of energy savings. If a project is not performing as intended, ESG engineers will investigate the operation of the equipment and identify any energy-related loads that may have been added after the project was completed that may have affected the energy savings. Items such as building additions, additional computers, and large changes in occupancy can vastly affect the energy usage. ESG will not specify how the buildings should be operated. We do not sacrifice comfort or a healthy environment for energy savings. Our energy calculations will be performed based on a negotiated occupancy and schedule of building usage. If these schedules or building usages change over time, then we will adjust the guaranteed savings accordingly.

Training in O&M for Installed Improvements

ESG proposes training and monitoring as an integral part of this ESPC project. Technical support and flexibility are key components of ESG's support services plan. Training site personnel in the utilization of the new systems, combined with systems monitoring, contributes to the proficiency of the staff and maximizes the level of efficiencies designed in our solutions.

ESG will design a training program for your staff (customized and based upon the current expertise level of the present maintenance staff). The training program subject matter will include exactly what it takes to perform the required functions, what skill levels are required, and what specialized tools and instrumentation will be necessary. Our goal is to provide a sufficient amount of training such that Marshall County's maintenance staff is fully capable of maintaining the new equipment at its peak efficiency. In addition, ESG will offer additional customized training as required for upgrades in building management computer software.



2. Provide detailed description of the recommended Measurement and Verification (M&V) Plan for measures with savings guarantees as required by KY 45A.352 (2) (a.).

Once on-site, our development team will conduct an analysis of your facilities, reviewing major building systems, control sequences, and overall operation through field measurement and analysis equipment. Using benchmarks of operational performance, maintenance standards, costs, and similar measures from other facilities, we will gauge the current level of performance of your facilities. When appropriate, ESG may also use energy analysis and facility modeling software to examine your utility consumption, identify indications of current operational inefficiencies, and determine a facility's pattern of use. Advanced building modeling software may also be utilized to predict the impact that various changes to building envelopes, mechanical equipment, controls, and electrical systems will have on utility consumption for each building.

After completing the facility assessments, we will identify potential solutions to address your existing facility and operational needs. Energy and operational savings potential will be calculated for each solution, and pricing will be attained to establish implementation costs. ESG will then recommend equipment, installation, and design solutions based on best value with consideration for life cycle cost, reliability, and efficiency. We will present these recommendations for review and approval during meetings with County representatives and develop a final scope of work that will improve the operating efficiency and comfort level of your facilities. Data collected through the needs analysis is essential for developing self-funded solutions that reflect true utility and operational cost savings.

Measurement and Verification Plan

Measurement and Verification (M&V) is essential to validating the guaranteed savings. ESG's M&V personnel will be involved with the project from conception to commissioning throughout the contract term. The Lead Project Engineer will serve as your point of contact for M&V information and will use the corporate resources of ESG's M&V team to provide documentation that the installed systems are performing at guaranteed levels.

ESG's methodologies are in full compliance with those defined by International Performance Measurement and Verification Protocol (IPMVP) standards (shown in the Table below). ESG is well versed and has significant experience with each of these M&V protocols. The majority of our guarantees utilize IPMVP Option C (utility bill comparison-based M&V), which provides ongoing focus on operating your facilities in an energy-efficient manner. ESG will evaluate the best protocol based on your goals, as well as the appropriateness of the M&V option for the specific measures installed.



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IPMVP Options

M&V Option	Performance and Operational Factors	Savings Calculations
Option A—Stipulated and measured factors	Based on a combination of measured and stipulated factors. Measurements are spot or short term taken at the component or system level. The stipulated factor is supported by historical or manufacturer data.	Engineering calculations, component or system models.
Option B— Measured factors	Based on spot or short-term measurements taken at the component or system level when variations in factors are not expected. Based on continuous measurements taken at the component or system level when variations are expected.	Engineering calculations, component or system models.
Option C—Utility billing data analysis	Based on long-term, whole-building utility meter, facility level, or sub-meter data.	Based on regression analysis of utility billing meter data.
Option D—Calibrated computer simulation	Computer simulation inputs may be based on several of the following: engineering estimates; spot, short-, or long-term measurements of system components; and long-term, whole-building utility meter data.	Based on computer simulation model calibrated with whole-building and end-use data.

IPMVP Options are selected based upon our clients' desired outcomes, the cost versus the benefit associated with following the protocol, and the specific solution being measured. Visit <http://www.evo-world.org/index.php?lang=en> to learn more about IPMVP.

ESG guarantees all energy savings using the most appropriate methodology for accuracy and cost effectiveness. The factors that determine the appropriate M&V option include:

- The complexity of the ECM
- Risk mitigation
- The potential for changes in key factors between the baseline period and the performance period

Savings results for our clients have an average positive deviation of more than 10%. We believe this is the strongest evidence of our company's ability to calculate savings and then follow-up with our clients to help them achieve the savings they expect and more. ESG will work with your personnel to define a customized approach for M&V that best reflects your goals. ESG is comfortable working in partnership to customize an M&V process that is accurate and helpful in maximizing savings results for the term of this project.



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For the solutions outlined in this RFP response, ESG proposes the Measurement and Verification options identified in the table below:

Recommended IPMVP Option to Be Applied

Building	Electric Utility	Natural Gas Utility	Water/Sewer Utility
Courthouse	C	C	A
Detention Center/Class D/911/ISO	C	C	A
Judicial Building	C	C	A
Road Department	A, Agreed Upon	A, Agreed Upon	A
County Park	Agreed Upon	N/A	N/A

Overview of the Technical Approach that Is Used to Identify, Evaluate and Recommend Energy Efficiency and Conservation Measures

For the purposes of this response, we have provided a description of our standard technical approach that is used to identify, evaluate, and recommend energy efficiency measures. Upon selection, we recommend that the County allow additional time to collectively discuss the needs and concerns for each of the County's facilities in order to ensure a comprehensive project that maximizes the guaranteed savings resulting from installed measures.

Assessment

Our program will begin with a detailed assessment of your facilities and infrastructure. We will analyze current and historic utility consumption as well as recurring operational and maintenance costs associated with maintaining system function and site operation. Data collected during the assessment will be used to develop a preliminary assessment report. This report will include a comprehensive list of proposed energy and operational cost saving measures designed to meet your project goals and objectives. Estimated costs (including design, engineering, installation, maintenance, repairs, and debt services) and savings will be provided for each proposed measure. We will present this preliminary assessment report to your designated representatives and determine which measures are agreeable to the County. These measures will then become the focus of the detailed engineering and project development phase.

Detailed Engineering and Project Development

During the detailed engineering and project development phase, our in-house engineering team will further analyze the existing conditions of your facilities and the proposed solutions identified in the assessment phase. We will work with appropriate subcontractor partners to assist with measures that require specific technology or design expertise in order to identify the best equipment replacements or retrofits for your facilities. Project cost and savings estimates will be refined for contract ready pricing, and the measurement and verification plan will be developed on a per solution basis. A registered professional engineer (PE) will supervise, review, and approve design work, and a certified measurement and verification professional (CMVP) will review the measurement and verification plan established for each guaranteed measure. Both the PE and the CMVP will be employed by ESG, and the PE will be registered in the Commonwealth of Kentucky.

The result of this phase will be a shovel ready project. Contract negotiations and financing arrangements typically occur at the end of this phase in order to ensure timely initiation of construction. 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



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competition produces the best deal for our customer. ESG has in-house financing expertise that is available to assist Marshall County with project financing as a service. Additionally, ESG is experienced with assisting customers with grant applications and utility rebates for which the customer may qualify.

3. Provide the estimated costs of annual reconciliation statements and any required on- going services.

Estimated Costs of Annual Reconciliation Statements, Measurement and Verification, and Other Required On-going Services

ESG provides a number of valuable services with each of its ESPC projects. Some of these services are essential to the overall project requirements; therefore, the cost for such services is included with our overall program. The following services for Equipment and Operations Training, and Preventive Maintenance Schedules and Plan are included in our project pricing:

ESG offers the following Technical Services:

- Equipment Training — We will provide in-house training on all equipment that is installed with our program. This training can be structured as a one-time session or continue periodically throughout the warranty period.
- Operations Training — We will provide instruction on operating all equipment installed within the scope of our project.
- Preventive Maintenance Schedule and Plan — We will provide the maintenance staff with a preventive maintenance schedule and plan for the newly installed equipment. Maintenance plans will be generated utilizing manufacturers' recommended maintenance tasks and intervals.
- Maintenance and Operations Manuals — We will provide manuals for all installed major equipment and/or systems upon completion of the project installation.
- Measurement and Verification Services — We will provide the required Measurement and Verification services to validate the savings guarantee is being met.

Measurement and Verification

ESG does develop and implement a Measurement and Verification (M&V) Program designed to meet IPMVP requirements and standards. The M&V approaches used will be based on the location of the improvements and the type of improvements selected for implementation. ESG is recommending the use of Options A and Option C for all guaranteed savings.

Annual reconciliation statements for Measurement and Verification services are developed for our customers and are intended to meet the requirements of the Kentucky Legislation.

The annual fee will be negotiated based on the final M&V approach selected by the County. For the purposes of this analysis, M&V services are estimated to be around \$19,000 in the first year, increasing at a fixed rate of 3% annually thereafter. M&V services for the first three years have been included in the cost estimate for this proposal. After the first three years, the County is not obligated to continue with annual Measurement and Verification.



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4. Indicate any equipment maintenance service contracts and their costs which will be required by your firm as a condition of the energy services guarantee.

Equipment Maintenance Service Contracts and Costs

On-going Service Contracts

In order for the installed systems to continue to save energy and provide dependable service, it is imperative that they continue to operate as they were designed and installed. To achieve these goals, a thorough understanding of the operation and maintenance of these systems is required. This responsibility can either be handled by your personnel alone or with the assistance of outside resources through an ongoing service contract. Regardless, *ESG does not require that service contracts be imposed on our customers.* We are prepared to work with your representatives to provide technical training for equipment and systems installed through our project that minimizes or eliminates the need for service contracts.

Limited Cost of Required Services

If any additional technical training or maintenance-related services are required, ESG will provide those additional services at a negotiated amount based on the customized services needed. These programs are in addition to warranty services provided.

Marshall County's Preference for Maintenance Contract

During the course of ESG's visits to Marshall County, we were made aware that Marshall County would like to investigate some form of service contract to help to keep up with the maintenance. This is something that ESG can facilitate during the full development phase since the creation of a maintenance contract is more of a collaborative process. This will allow the specific concerns of the County to be fully addressed.



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2.3. Company Qualifications and Approach to Project

E. Project and Construction Management

Provide the company's proposed implementation plan and a preliminary project schedule.

ESG understands that our job is to deliver your project on time while ensuring that your expectations are met or exceeded. Ensuring best practices for all aspects of construction management is critical to the successful implementation of our performance based projects. Some of the specific benefits of our process include:

- Marshall County will have a single point of responsibility. Our Project/Construction Manager will coordinate the efforts of all our personnel and subcontractors.
- Marshall County will participate in supplier and subcontractor selection while the performance obligation will remain with ESG.
- We will provide a guarantee of no change orders other than those authorized by Marshall County to expand the scope of work.
- Marshall County and ESG will agree upon clearly delineated expectations by all parties to ensure that the project meets expectations.
- We will provide excellent communication and prompt problem resolution.
- We will provide a final training and commissioning process that ensures functionality.

ESG – Project Managers

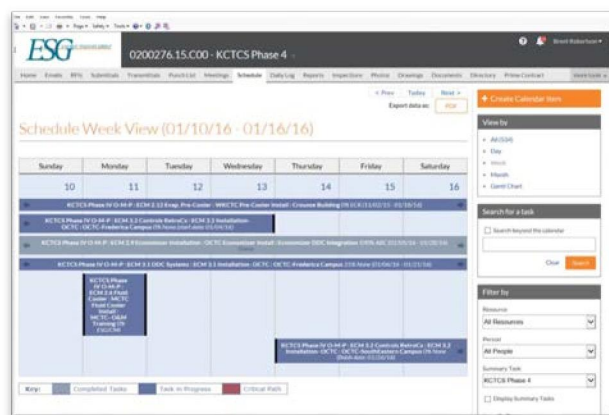
Our ESG project managers provide timely installation of solutions in the least disruptive manner possible in order to ensure complete Customer Satisfaction.

Our process to deliver all improvements in a timely and efficient manner with minimal disruption to the working environment is described below.

Schedule Management

ESG is sensitive to the ongoing needs and operational requirements of Marshall County. We use the project schedule to proactively communicate critical activities that impact you. When developing a project schedule, we focus on identifying all necessary utility shutdowns as early in the project as possible in order to enable you to successfully prepare for these disruptions in service. We plan to perform shutdowns during off peak/off season periods to minimize the potential impact on comfort.

Procore construction management software will be used for schedule management. Utilizing real time data in Procore and maintaining ongoing, open communication with our clients, ESG Project and Construction Managers have the ability to monitor progress and clearly articulate expectations to subcontractor partners following our regimented delivery process. Our Project and Construction Managers will also use this information to hold subcontractors and suppliers accountable for their actions through consistent field supervision, inspection and documentation of any specific corrective actions.



Real-time schedule management is conducted using cloud-based Project Management software. This tool provides accountability and the visibility to monitor ongoing progress.



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Project Management Software

ESG uses project management software that enhances our ability to manage projects. Procore drastically increases project efficiency and accountability by streamlining and mobilizing project communications and documentation. Procore is a cloud-based application that features a variety of benefits, including secure, permissions-based accessibility for all project participants. Limiting the reliance on paper-based documentation, email chains, and spreadsheets to manage our projects, Procure minimizes costly risks and delays.

Sub-Contractor Selection and Management

In order to perform at the level described within this section, ESG must work closely with Marshall County to make final contractor selections that are balanced between ability to perform and value offered. ESG adheres to a stringent prequalification process for all subcontractors to ensure that they meet licensing, quality, and safety standards. Management of subcontractors is a core competency of ESG's Project Managers. Upon contract award, we take ownership of the project and fulfill our responsibilities with a clear understanding of your expected outcomes. Sound scheduling practices, reliable cost control measures, and close supervision of subcontractors are the fundamental elements that allow us to perform our construction activities in a manner that obtains sustainable results.

Safety Management Program and Implementation Plan

ESG is committed to promoting safety awareness and accident prevention for a safe work environment for our employees, subcontractors, as well as for your employees and visitors. Our safety program is administered by our Project Management team and monitored by our dedicated Corporate Safety personnel. Safety will be incorporated in the planning, construction, and maintenance of the project site and equipment and will comply with applicable rules and regulations as required by Federal, State, County and ESG requirements. Prior to project initiation, ESG's Corporate Safety personnel will review subcontractor safety information including, but not limited to, subcontractor worker's compensation experience modification rates, OSHA recordable incident rates, OSHA activity history, On-site Safety Meetings, and subcontractors' safety programs.

ESG has on staff a Corrections and Security Specialist, John Motley, who works closely with the engineering and project management teams on all corrections, jail, and detention center ESPC projects to assure a timely, well-engineered and constructed project is delivered. John has 23 years of experience working in corrections as a Senior Construction Superintendent, a Deputy Warden, and Warden. He has participated on the design team for Eastern Kentucky Correctional Complex, Green River Correctional Complex, and Little Sandy Correctional Complex. He also oversaw the construction of Eastern Kentucky Correctional Complex. His experience in construction oversight, thorough knowledge and familiarity with correctional facilities through involvement in design review teams, and his knowledge and understanding of the critical aspects of security in correctional facilities brings invaluable expertise to our project team.

John acts as a liaison for security design criteria and construction requirements with primary responsibility for:

- Coordinating audit activities at detention facilities.
- Assisting engineering personnel to properly gather data, select appropriate energy conservation measures and assure that correctional facility design requirements are followed.
- Reviewing designs and scopes of work for compliance with all security and corrections' codes and selecting the design and construction subcontractors that are qualified for corrections work.
- Assisting the Project Manager in preparation of subcontracts and cost reviews to assure proper scope, pricing and risk review and in coordination of all on site construction activity.
- Participating in security clearance coordination of all on site personnel, both ESG and subcontractors.

PROCORE

Procure tools include:

- Bidding
- Budgeting
- Contract & Change Management
- Daily Log
- Dashboard
- Directory
- Document Management
- Drawing Management
- Email Tracking
- Meeting Minutes
- Photos
- Punch Lists
- Reporting
- RFIs
- Schedule Integration
- Submittals
- Timecard
- Transmittals



Response to Request for Proposals for Marshall County Fiscal Court



Project Commissioning

Commissioning is a quality assurance process for the installation of new or renovated systems in a building. It is used to achieve, verify, and document the performance of each system to meet the operational needs of the building within the capabilities of the documented design and specified equipment capacities. Successful commissioning includes the preparation of manuals and training of operation and maintenance personnel. The result of commissioning should be fully functional systems that can be properly operated and maintained throughout the useful life of the building. Commissioning activities and processes are customized to the specific scope of work selected. The most complicated scope items (i.e. DDC controls) will require and receive the most commissioning effort. Simple items such as lighting and water conservation will typically require less commissioning.

Commissioning Objectives

A successful commissioning plan for Marshall County will include well-structured turnover documents (i.e., manuals, as-builts, submittal data, and final sequences of operation) that provide easy reference for equipment and system operation and maintenance. Marshall County should expect the following results from successful commissioning:

- Improved operator knowledge of how building systems should operate or be maintained
- Reduced ongoing training requirements
- Performance in accordance with engineer's intent and the contract document
- Reduced downtime due to easier diagnosis of failures
- Improved ability to provide accurate information to occupants regarding maintenance of environmental conditions in the occupied space throughout the year
- Reduced operating costs due to optimized performance and improved operational techniques
- Increased comfort and reduced complaints

ESG – Commissioning Process

*Our thorough
commissioning process
validates proper operation
of installed equipment and
is an important aspect of
ensuring guaranteed
savings are met.*

Commissioning Team

All participants in the project have a commissioning responsibility. Participants include your facilities management and maintenance personnel, ESG project management and engineering personnel, and all applicable subcontractors. The project building operation and maintenance managers will be brought into the commissioning process early, preferably during the design phase. Their knowledge of occupancy, special lighting, anticipated equipment loads, and other factors should influence the design and set performance objectives. The responsibility of each member of the commissioning team will be documented in the commissioning plan.

While we are flexible in how we work with customers, we have a reliable process with detailed tasks that are important to being assured we install the project as designed. The following phases are ESG's approach for Project Management that provide the most effective project:

I - Planning Phase

Many steps that requires the participation and skills of the Project Manager take place prior to finalizing the contract. The following steps will be performed by the Project Manager:

- Accompanying engineers on walk-throughs during the audit phase.
- Assisting in the bidder selection process through collaboration with the County's staff.
- Developing a preliminary project schedule for the defined work scope.
- Reviewing the scoping documents prior to the subcontractor walk-throughs.



- Developing the final project schedule during the proposal development phase to determine how work will be performed.
- Participating in the formal risk review during the contract development phase.
- Reviewing the detailed M&V plan with the Lead Engineer.

II – Pre-Construction Phase

The Pre-Construction Phase takes place prior to actual field construction. The following steps will be performed:

- Reviewing performance criteria and project definition with subcontractors k.
- Documenting agreements with subcontractors on bid clarification form.
- Executing subcontracts.
- Coordinating pre-purchase of long-lead items.
- Developing the project safety plan.
- Obtaining proper permitting to construct the project.
- Developing a table of required tests to be performed by subcontractors at the project site.
- Documenting existing facility conditions that could incur a cost risk.
- Completing Contact List form.
- Completing Address List form.
- Conducting the subcontractor kickoff meeting.
- Conducting the staff/subcontractor meeting.

III – Construction Phase

During the Construction Phase, the following steps will be performed:

- Initialing M&V measurements and data collection.
- Coordinating site storage area for subcontractor construction material.
- Weekly progress meetings with subcontractors.
- Periodic update meetings with Marshall County staff to inform the County of all construction progress issues and schedule progress.
- Evaluating schedule progress and compliance at the project site.
- Invoicing/billing/revenue recognition.
- Enforcing project safety plan at the construction site.
- Enforcing clean work site issues in the project facilities.
- Periodic testing and construction inspection.
- Requesting engineering assistance to support the construction field issues when, and if, required.



IV – Commissioning Phase

During the Commissioning Phase the following actions will be undertaken:

- Providing factory-trained technicians for start-up of all equipment and systems included in the project scope.
- Developing and distributing project Operations and Maintenance (O&M) Manuals.
- Documenting the final control system calibration, adjustments, and owner training.
- Documenting final testing and adjustment of all equipment and systems included in the project scope.
- Completing and turning over final “As Built” drawings to Marshall County Fiscal Court.
- Assembling testing documentation.
- Providing training for County staff.
- Obtaining final M&V measurements and data collection.
- Developing punch list.
- Validating warranty start date.

V – Closeout Phase

During the Project Closeout Phase, the following actions will be performed:

- Turning over required documentation to the Marshall County Fiscal Court.
- Obtaining the Fiscal Court’s signature on **ESG’s** Letter of Acceptance, signifying project closeout.
- Reviewing final subcontractor billing.
- Closing out Marshall County’s project subcontracts.
- Completing the project file.

Effective project management applies technical expertise, project knowledge, people and communication skills, as well as management talent in a proactive manner to ensure contract commitments are met on time, within budget, and with the quality expected by you.

Marshall County ESPC Preliminary Schedule

ESG understands that many of the outlined actions in the preliminary schedule require Fiscal Court approval and coordination with outside agencies to schedule meetings or hearings and may require more time. Some steps have been intentionally omitted for brevity (i.e., AOC agreement, financing RFP, etc.). Below is a preliminary schedule for actions and activities associated with project development, approvals, construction, and final acceptance for Marshall County:

Anticipated Notice to Proceed/Letter of Intent	August 16, 2017
Scope Development	August 17-November 2017
Project Development Agreement	September 15, 2017
Contract Approved	November 2017
Petition for Bond Hearing or Notice of Intent to Finance	November 2017
Financing	December 2017
Project Kick-Off Meeting	December 2017
Installation of Measures	January 2018-September 2018
Project Walkthrough	October 2018
Project Substantial Completion	October 2018
Project Support Documentation & Training	November 2018
Final Acceptance	November 2018



2.3. Company Qualifications and Approach to Project

F. Financial Approach

The respondent should describe financial alternatives that will responsibly maximize the net economic benefit and minimize financial risk.

1. Provide descriptions of the sources, types and costs of financing available and recommended for use in this program.
2. Indicate any penalties or other costs that will be assessed in the event the decision is made not to proceed with this project at any point prior to mutual approval of a Contract Agreement.
3. Describe the basis of guarantee, its execution, and the methods of payment or remedy that will be provided if the project fails to provide the Guaranteed Savings.
4. Include a copy of your firm's Energy Savings Guarantee.
5. Provide a preliminary financial model incorporating all initial estimated cost of ESPC project including installation/construction, required on-going services, engineering, commissioning, measurement and verification, annual reconciliation statements, financing, and any other costs along with the guaranteed project savings for the recommended project. The model must show a summary of proposed method and costs of financing with cash flow including to what extent the project savings are sufficient to cover project costs.

1. Provide descriptions of the sources, types and costs of financing available and recommended for use in this program.

Financing is a critical aspect of the contracts provided by ESG. The essence of our business is that projects pay for themselves through savings, and we are accustomed to assisting customers in structuring and accessing the financing so that it is "funded" through savings generated by the project.

ESG, on your behalf, will solicit bids from local banks of your choice or assist you in pursuing financing through a fiscal agent such as Ross, Sinclair or one of KACo's programs. KACo Finance Corporation (KACoFC) is a bond pool program designed to help counties and local governments receive a higher Standard & Poor's Bond Rating than most counties could achieve on their own.

Another option is a Master Lease through the Commonwealth of Kentucky. Pursuant to [KRS 45A.050\(3\)](#) political subdivisions including counties may participate in the state agency Master Agreements to the same extent as agencies of the Commonwealth.

Current rates for fifteen to twenty-year tax-exempt financings are approximately 3.2% to 3.80% (July 2017). We work closely with our customers to ensure that our engineered project solutions are appropriately tailored to the financing requirements of the customer and available offerings in the marketplace. 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.) ESG has in-house financing expertise that is available to assist customers with project financing as a service.

Most of our 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. These transactions (normally single-investor financings) are often structured as lease-purchase agreements, and sometimes as installment purchase agreements. Typically, these lease-purchase or installment purchase agreements are appropriation-based, and do not constitute long-term debt.



Response to Request for Proposals for Marshall County Fiscal Court



As a rule, ownership of the energy conservation measures provided by ESG passes to the customer (Marshall County) on installation and acceptance. The lender retains a security interest or collateral position in the measures. In most cases, there is no other collateral provided in financing performance contracts.

We maintain relationships with various financial institutions to make sure the most appropriate financing is available to our customers. Bank of America, BB&T, Capital One, PNC, Regions Bank and SunTrust are some of the institutions we currently work with to offer specialized tax-exempt financing. With respect to project financing, we intend to provide whatever level of service and support you desire.

Each of these options have pros and cons and will need additional evaluation once the final project has been developed. Our final evaluation for this program will need further vetting and direction from the executive staff and fiscal court.

2. Indicate any penalties or other costs that will be assessed in the event the decision is made not to proceed with this project at any point prior to mutual approval of a Contract Agreement.

In recognition of the need for a detailed development phase following the County's selection, ESG typically incorporates a nominal fee within our Project Development Agreements in the event the County decides not to proceed with the project. ESG believes that the highest value projects stem from a very close collaboration with the customer. We can only determine project direction, scope, and magnitude after detailed conversations, which convey the current and future needs of the County. As the work associated with this project development is predicated on these discussions, the exact fee cannot be accurately determined at this time. ESG views these fees as a way to simply cover our costs for the investigation. In other words, our business is the development and implementation of high value, best fit projects for all of our customers, not auditing.

3. Describe the basis of guarantee, its execution, and the methods of payment or remedy that will be provided if the project fails to provide the Guaranteed Savings.

ESG has a proven track record of accurately calculating the impact of Energy Conservation Measures (ECMs). Throughout our project phases, we communicate with our customers, ensuring that there is mutual understanding of our processes and procedures, including how we calculate energy savings.

Establishing a Baseline

Calculating savings requires the ability to measure against a fixed set of conditions, which in guaranteed savings projects is the base period (often referred to as the baseline) energy and water usage. Proper determination of savings includes adjusting for changes that affect energy use but that are not caused by the conservation measures. Such adjustments may account for differences in weather and occupancy conditions between the baseline and performance periods. In general, Savings = (Baseline Energy Use) adjusted - (Post Installation Energy Use).

In order to establish the baseline, we analyze your utility bills and energy-use profiles. Historic energy consumption and utility billings are also used to identify potential ECMs and their magnitude. Analysis of the electric demand, electric load factor, electric power and gas usage during peak and lowest usage months, along with water usage, sewer charges, O&M records, and similar relevant data provides our team with the necessary information to identify the maximum amount of utility and operational savings opportunities.

Once a baseline is established we utilize a number of data gathering tools and processes to obtain all the relevant information required to calculate energy consumption pre- and post-implementation in order to assess the economic impact of recommended facility improvements.

ESG typically utilizes the industry standard measurement and verification protocol known as the International Performance Measurement and Verification Protocol (IPMVP) for non-Federal customers. Within IPMVP



Response to Request for Proposals for Marshall County Fiscal Court



baseline and post-installation energy use is determined using one of four methods. These approaches are termed M&V Options A, B, C, and D and are defined in Section 2.3.D Services of this response. The primary factors used to determine which option is appropriate for measuring savings for an ECM are:

- the level of M&V rigor required to obtain the desired accuracy level in the savings determination
- the complexity of the ECM
- the potential for changes in performance
- the measured savings value

In order to understand your cost of operations, we will collect the following:

- Utility billings for two or more years for each facility
- Documented maintenance and operational expenses
- Planned and projected changes to the facilities' usage schedules
- Budgeted capital expenditures to modify, add, or eliminate facilities
- Budgeted maintenance and operational expenses for anticipated equipment replacements

Our approach to including operational costs savings in any project is dependent upon two variables:

- 1) The savings must be quantifiable, real dollars
- 2) the savings must be reviewed and approved by the County

Operational cost measures are quantified utilizing real data, such as outside service invoices, provided to ESG by your representatives.

4. Include a copy of your firm's Energy Savings Guarantee.

ESG has an exemplary track record of meeting or exceeding performance guarantees. We are skilled at resolving variations that naturally occur during performance evaluation periods and have a general policy in managing project variations. Guarantee provisions for project result variations are normally handled in the following manner:

Beginning with the first complete utility billing period following Marshall County's final acceptance of the ESPC project, year 1 usage patterns will be compared to base year usage patterns to determine the actual savings for the first annual period. If actual savings from the first one-year period are less than the base year guaranteed savings amount, Energy Systems Group will pay Marshall County a cash refund equal to the difference in these amounts. This comparison will also be completed at the end of each subsequent year with cash refunds being paid annually for the contract term to Marshall County if guaranteed savings amounts are not achieved.

If actual savings exceed guaranteed savings amounts, the excess savings are resolved over the course of the contract in a manner that is beneficial to Marshall County. It is agreed that the proposed operating savings are available to Marshall County and such savings will be documented in our contractual agreement. Utility costs during the construction period will be audited and any savings credited against the first year's savings guarantee.

All payments between Marshall County and Energy Systems Group will be made within 60 days of the end of each annual period. This guarantee, whether or not exercised by Marshall County, is ESG's sole liability with respect to any claim of energy savings. This guarantee is dependent upon Marshall County continuing to both follow and document a mutually defined and prescribed Operation and Maintenance plan or contract with ESG for Guarantee Auditing/Management Services.



Excess savings will be documented and handled through a mutually determined process. ESG will calculate and document savings. ESG is responsible for any savings shortfalls. Marshall County will be the beneficiary of any excess savings. As is the case with each of our customers, ESG's primary objective is to meet or exceed customer expectations in all aspects of the performance guarantees.

5. Provide a preliminary financial model incorporating all initial estimated cost of ESPC project including installation/construction, required on-going services, engineering, commissioning, measurement and verification, annual reconciliation statements, financing, and any other costs along with the guaranteed project savings for the recommended project. The model must show a summary of proposed method and costs of financing with cash flow including to what extent the project savings are sufficient to cover project costs.

On the following pages are a 15-year and a 20-year preliminary financial model incorporating all initial estimated costs of an ESPC project including installation/construction, required on-going services, engineering, commissioning, measurement and verification, annual reconciliation statements, financing, estimated interest, and any other costs along with the guaranteed project savings for the recommended project.

The only difference between these two cash flows is the term. One shows the cost of the project spread over 15 years, with the savings for only 15 years shown in the project. The other shows the cost of the project spread over 20 years, with savings shown for the full term. Each has a conservative estimate for the utility rebates (\$20,000).

Each project requires a \$400,000 one-time payment. In the 20-year project, if the County prefers, this can be reduced slightly as the savings is greater than the annual cost of the project. This may require some payment schedule arrangements with the entity holding the loan.

Kentucky Revised Statutes state that ESPC project awards are based on value, not lowest price and several variables are assumed for illustration purposes only:

- As stated, this financial model is preliminary based on initial findings and additional meetings and discussions are recommended for a collaborative final project scope.
- The interest rate and term will be determined at time of contract, 3.25% is used based on current market trends.
- While \$400,000 is shown as "Committed Capital Funding" a project can be developed that is budget neutral with a project can be developed that includes less priority scope measures.
- The "Annual Utility Rate Increase" is based on historical rates as well as the "Annual Operational Savings Increase."

15 Year Project Cash Flow Estimate

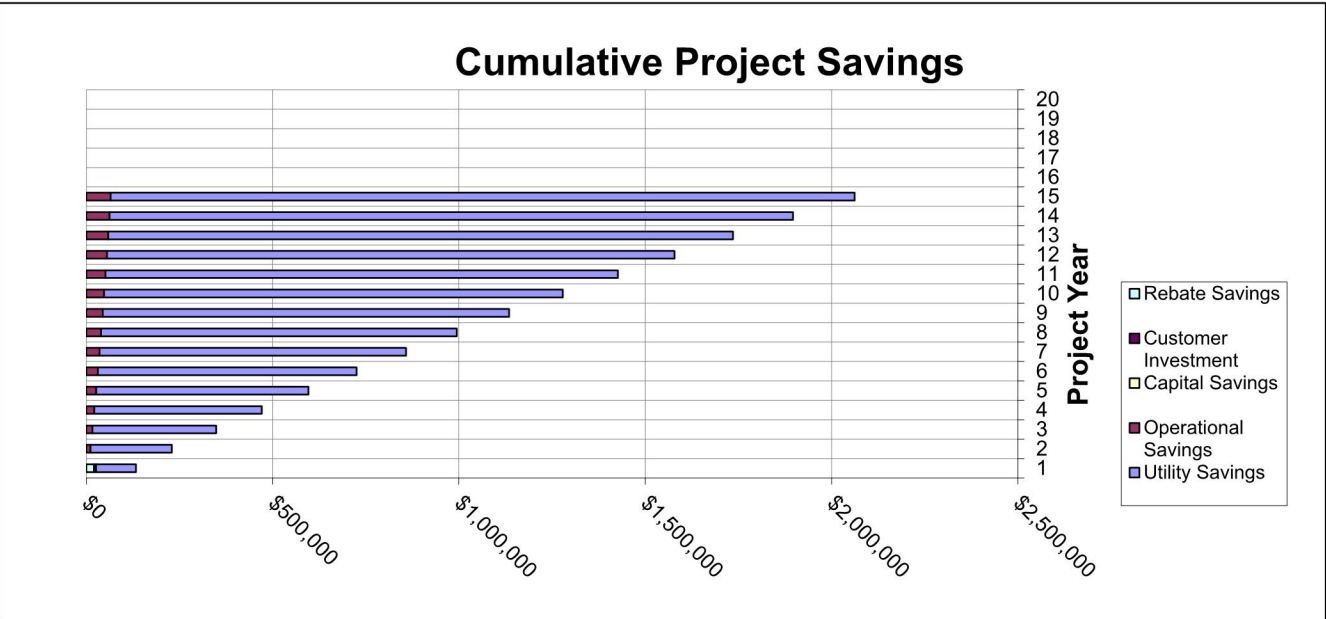
Total Savings Over Project Term	
Utility:	\$1,996,798
Operational:	\$65,138
Capital:	\$0
Rebates:	\$20,000

Marshall County Fiscal Court
August 8, 2017

Term Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Calendar Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ANNUAL SAVINGS															
Annual Energy Savings:	\$107,361	\$110,582	\$113,899	\$117,316	\$120,836	\$124,461	\$128,195	\$132,040	\$136,002	\$140,082	\$144,284	\$148,613	\$153,071	\$157,663	\$162,393
Annual Operational Savings:	\$5,690	\$5,462	\$5,244	\$5,034	\$4,833	\$4,639	\$4,454	\$4,276	\$4,105	\$3,941	\$3,783	\$3,632	\$3,486	\$3,347	\$3,213
Annual Capital Cost Avoidance:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Rebate Savings:	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Total Savings:	\$133,051	\$116,044	\$119,143	\$122,350	\$125,669	\$129,100	\$132,649	\$136,316	\$140,106	\$144,022	\$148,067	\$152,244	\$156,557	\$161,010	\$165,606
Annual Customer Investment:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Annual Program Savings:	\$133,051	\$116,044	\$119,143	\$122,350	\$125,669	\$129,100	\$132,649	\$136,316	\$140,106	\$144,022	\$148,067	\$152,244	\$156,557	\$161,010	\$165,606
ANNUAL COSTS															
Annual Lease Payment:	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953	\$112,953
Annual M&V Costs:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Support Services Costs:	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000
Total Proposed Annual Costs	\$19,000	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953	\$131,953
Annual Cash Flow	\$114,051	(\$15,908)	(\$12,809)	(\$9,602)	(\$6,284)	(\$2,852)	\$696	\$4,364	\$8,154	\$12,070	\$16,114	\$20,292	\$24,605	\$29,057	\$33,653
CUMULATIVE DATA															
Cumulative Cash Flow	\$114,051	\$98,143	\$85,333	\$75,731	\$69,447	\$66,594	\$67,290	\$71,654	\$79,807	\$91,877	\$107,991	\$128,283	\$152,888	\$181,945	\$215,599
Cumulative Project Costs	\$19,000	\$150,953	\$282,905	\$414,858	\$546,811	\$678,763	\$810,716	\$942,669	\$1,074,621	\$1,206,574	\$1,338,527	\$1,470,480	\$1,602,432	\$1,734,385	\$1,866,338
Cumulative Project Savings	\$133,051	\$249,095	\$368,238	\$490,589	\$616,257	\$745,358	\$878,006	\$1,014,322	\$1,154,429	\$1,298,451	\$1,446,518	\$1,598,763	\$1,755,320	\$1,916,330	\$2,081,936
SAVINGS BREAKDOWN															
Cumulative Energy Savings	\$107,361	\$217,943	\$331,842	\$449,158	\$569,994	\$694,455	\$822,650	\$954,690	\$1,090,692	\$1,230,774	\$1,375,058	\$1,523,670	\$1,676,742	\$1,834,405	\$1,996,798
Cumulative Operational Savings	\$5,690	\$11,152	\$16,396	\$21,430	\$26,263	\$30,903	\$35,357	\$39,632	\$43,737	\$47,678	\$51,460	\$55,092	\$58,578	\$61,925	\$65,138
Cumulative Capital Savings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cumulative Rebate Savings	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cumulative Customer Investment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Payment Schedule: Quarterly Payments at End of Period

Financial Summary	
Total Project Cost:	\$1,736,766
Committed Capital Funding:	\$400,000
Financed Investment Cost:	\$1,336,766
Rate of Financing:	3.25%
Term of Financing:	15 Years
Total Savings Over Term:	\$2,081,936
Annual Utility Rate Increase:	3.00%
Annual Operational Savings Increase:	-4.00%
Annual Cost of Capital Increase:	0.00%
Total Net Cash Flow:	\$215,599
Simple Payback:	10.05 Years



20 Year Project Cash Flow Estimate

Total Savings Over Project Term	
Utility:	\$2,884,830
Operational:	\$79,375
Capital:	\$0
Rebates:	\$20,000

Marshall County Fiscal Court
August 8, 2017

Term Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Calendar Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
ANNUAL SAVINGS															
Annual Energy Savings:	\$107,361	\$110,582	\$113,899	\$117,316	\$120,836	\$124,461	\$128,195	\$132,040	\$136,002	\$140,082	\$144,284	\$148,613	\$153,071	\$157,663	\$162,393
Annual Operational Savings:	\$5,690	\$5,462	\$5,244	\$5,034	\$4,833	\$4,639	\$4,454	\$4,276	\$4,105	\$3,941	\$3,783	\$3,632	\$3,486	\$3,347	\$3,213
Annual Capital Cost Avoidance:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Rebate Savings:	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Total Savings:	\$133,051	\$116,044	\$119,143	\$122,350	\$125,669	\$129,100	\$132,649	\$136,316	\$140,106	\$144,022	\$148,067	\$152,244	\$156,557	\$161,010	\$165,606
Annual Customer Investment:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Annual Program Savings:	\$133,051	\$116,044	\$119,143	\$122,350	\$125,669	\$129,100	\$132,649	\$136,316	\$140,106	\$144,022	\$148,067	\$152,244	\$156,557	\$161,010	\$165,606
ANNUAL COSTS															
Annual Lease Payment:	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159	\$91,159
Annual M&V Costs:	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Support Services Costs:	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000	\$19,000
Total Proposed Annual Costs	\$19,000	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159	\$110,159
Annual Cash Flow	\$114,051	\$5,885	\$8,984	\$12,191	\$15,509	\$18,941	\$22,489	\$26,157	\$29,947	\$33,863	\$37,908	\$42,085	\$46,398	\$50,851	\$55,447
CUMULATIVE DATA															
Cumulative Cash Flow	\$114,051	\$119,936	\$128,920	\$141,110	\$156,620	\$175,560	\$198,049	\$224,206	\$254,153	\$288,016	\$325,924	\$368,008	\$414,406	\$465,257	\$520,704
Cumulative Project Costs	\$19,000	\$129,159	\$239,319	\$349,478	\$459,638	\$569,797	\$679,957	\$790,116	\$900,276	\$1,010,435	\$1,120,595	\$1,230,754	\$1,340,914	\$1,451,073	\$1,561,232
Cumulative Project Savings	\$133,051	\$249,095	\$368,238	\$490,589	\$616,257	\$745,358	\$878,006	\$1,014,322	\$1,154,429	\$1,298,451	\$1,446,518	\$1,598,763	\$1,755,320	\$1,916,330	\$2,081,936
SAVINGS BREAKDOWN															
Cumulative Energy Savings	\$107,361	\$217,943	\$331,842	\$449,158	\$569,994	\$694,455	\$822,650	\$954,690	\$1,090,692	\$1,230,774	\$1,375,058	\$1,523,670	\$1,676,742	\$1,834,405	\$1,996,798
Cumulative Operational Savings	\$5,690	\$11,152	\$16,396	\$21,430	\$26,263	\$30,903	\$35,357	\$39,632	\$43,737	\$47,678	\$51,460	\$55,092	\$58,578	\$61,925	\$65,138
Cumulative Capital Savings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cumulative Rebate Savings	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cumulative Customer Investment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Payment Schedule:

Quarterly Payments at End of Period

Financial Summary	
Total Project Cost:	\$1,736,766
Committed Capital Funding:	\$400,000
Financed Investment Cost:	\$1,336,766
Rate of Financing:	3.25%
Term of Financing:	20 Years
Total Savings Over Term:	\$2,081,936
Annual Utility Rate Increase:	3.00%
Annual Operational Savings Increase:	-4.00%
Annual Cost of Capital Increase:	0.00%
Total Net Cash Flow:	\$520,704
Simple Payback:	10.05 Years

