

ENERGY: SECURING THE FUTURE



Energy Performance Contracting Manual for Mississippi's Public Agencies

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MISSISSIPPI DEVELOPMENT AUTHORITY
MISSISSIPPI

DISCLAIMER

This manual has been prepared for the Mississippi Development Authority's Energy Division to serve as a "how-to" guide for Mississippi's public agencies that are interested in procuring energy performance contracting (EPC) agreements that will reduce energy consumption and costs in their facilities.

The Mississippi Legislature enacted authorizing legislation that enabled the state's school districts, community colleges, universities, state and local government agencies and publicly owned and private nonprofit hospitals to use energy performance contracting to implement large capital-improvement energy projects and reap the associated long-term energy-saving benefits (see §31-7-14 of the Mississippi Code of 1972, as amended).

The intent of this EPC manual is to assist public agencies in investigating the use of energy-saving performance contracting arrangements to accomplish the goals of Mississippi's law.

Notice

This manual was prepared by Donahue & Associates, Inc., while under contract with the Mississippi Development Authority, Energy Division, with grant support from the U.S. Department of Energy (DOE), Rebuild America Performance Contracting Grant Number DEFG44-05R410981. The opinions expressed in this report do not necessarily reflect those of the state of Mississippi or DOE. Any reference to a specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of the same. The opinions, findings, conclusions or recommendations expressed herein are those of the author only and do not necessarily reflect the views of state of Mississippi or DOE.

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PART 1: INTRODUCTION

What is Energy Performance Contracting?

Across the country, energy performance contracting (EPC) is offered by Energy Service Companies (ESCOs) as a practical way for public sector entities to obtain and finance energy-saving projects for their facilities. EPC can provide the resources to finance and acquire needed capital equipment and improve energy efficiency and comfort in public buildings. The majority of states, including Mississippi, as well as the federal government, have enacted legislation that authorizes public facilities to use EPC for implementing energy improvement projects.

EPC is rapidly achieving widespread use by governmental agencies because it offers a means for overcoming constrained capital budgets, aging and inefficient buildings and equipment, and limited maintenance staff resources. In Mississippi, one of the most attractive and distinguishing features of EPC is the guaranteed energy cost savings that pay for all associated project costs over the life of the contract. This provides an opportunity for agencies¹ to free up scarce budget resources for other needed services and activities.

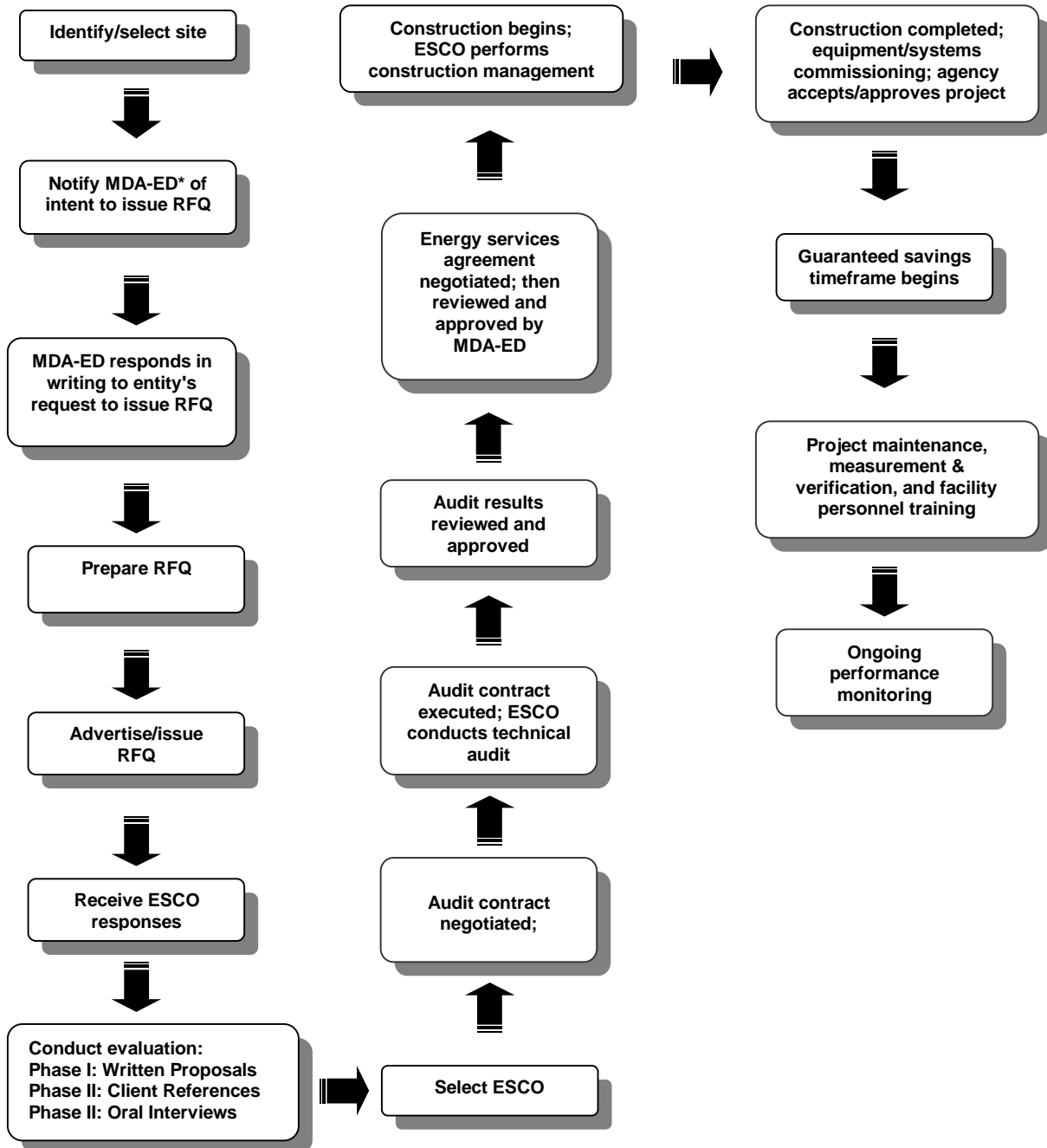
By allowing the energy cost savings to cover all project and financing costs, EPC provides agencies the ability to purchase these comprehensive energy improvements (e.g., lighting, heating, air conditioning, and system controls, etc.) and services from qualified ESCOs. Agencies in Mississippi are authorized to use EPC as provided for in §31-7-14 of the Mississippi Code of 1972, as amended. In Mississippi, projects are structured to produce a positive net savings for the agency.

For all agencies in Mississippi, the length of the contract term for EPC projects cannot exceed 15 years. Figure 1-1, on the following page, outlines procedural steps for developing and implementing an EPC project.

¹ For purposes of this report and to assist the reader, all public sector entities (e.g., state agencies, local governments [counties and cities], schools, community colleges, universities, and publicly-owned and private nonprofit hospitals) will be referred to as "agencies" or "agency".

FIGURE 1-1

Energy Performance Contracting Project Implementation



*MDA –ED: Energy Division of the Mississippi Development Authority

Mississippi Law

Due to legislative authority given to agencies, the state's school districts, community colleges, universities, state and local governmental agencies, and publicly-owned and private nonprofit hospitals can use EPC to implement large capital-investment energy projects and reap the long-term energy-saving benefits. In 2006, the law was amended to include the implementation of operating cost reductions, renewable energy, and water saving projects along with improved water distribution and metering accuracies.

The Mississippi EPC statute, codified at §31-7-14 of the Mississippi Code of 1972, as amended, is included in Appendix A at the end of this manual. Figure 1-2, which can be found on the following page, describes the key provisions of Mississippi's energy performance contracting law.

FIGURE 1-2

Key Provisions of Mississippi's Energy Performance Contracting Law

| Type of Provision | Description of Provision |
|--------------------------------------|--|
| Applicability | <ul style="list-style-type: none"> • Public school districts • Community colleges • Institutions of higher learning • Publicly-owned hospitals • State agencies • Private non-profit hospitals • Local governments (cities and counties) |
| Definitions | <ul style="list-style-type: none"> • Division - Energy Division of the Mississippi Development Authority • Energy services or energy efficient services - Energy efficiency equipment, services relating to the installation, operation and maintenance of equipment and improvements reasonably required to existing or new equipment and existing or new improvements and facilities • Energy performance contract - An agreement to provide energy services, such as the design, installation, financing and maintenance or management of the energy systems or equipment in order to improve its energy efficiency. The energy savings are guaranteed by the performance contractor and savings from energy, operations, maintenance and other cost-avoidance measures can be used to repay the cost of the project • Reduce operating cost - Elimination of future expenses or avoidance of future replacement expenditures as a result of new equipment installed or services performed. Contract can be used even if the sole expense being eliminated is maintenance expense |
| ECM's (energy conservation measures) | <ul style="list-style-type: none"> • Energy efficiency equipment • Services relating to the installation, operation and maintenance of equipment and improvements to existing or new equipment and existing or new improvements and facilities • Heating, ventilation and air conditioning systems • Lighting • Windows • Insulation • Energy management controls • Life safety measures that provide long-term, operating-cost reductions • Operation programs that reduce operating costs • Other improvements or equipment related to renewable energy, water and other natural resources conservation, including accuracy and measurement of water distribution and/or consumption • Other measures as determined by the Division |

| | |
|--|--|
| Procurement | Request for qualifications |
| Selection of ESCO | Must select the most qualified proposal based on experience and qualifications, technical approach, financial arrangements, the overall benefits to the entity, and any other relevant factors |
| Term | Up to 15 years |
| Contract Provision | Must contain the following annual allocation dependency clause: "The continuation of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the Legislature or other budgeting authority. If the Legislature or other budgeting authority fails to appropriate sufficient monies to provide for the continuation of the contract, the contract shall terminate on the last day of the fiscal year for which appropriations were made. The termination shall be without penalty or expense to the entity of any kind whatsoever, except as to the portions of payments for which funds were appropriated." |
| Savings Guarantee | <ul style="list-style-type: none"> • Guaranteed by performance contractor • Must be contained in the contract |
| Financing | Annual rate of interest paid cannot exceed the maximum interest rate to maturity on general obligation indebtedness permitted under Section 75-17-101 of the Mississippi Code |
| Required Approval (intent to issue RFP and contract) | <ul style="list-style-type: none"> • Must notify Division, in writing, as to intent to issue a RFP or a RFQ • Final contract to be approved by the Division |

ESCO Standard Services

ESCOs provide comprehensive technical services as a part of an EPC project. In addition to analyzing facility energy use and designing comprehensive projects, they provide ongoing equipment maintenance, project monitoring, and savings measurement and verification services that ensure persistent and reliable project performance. In essence, the ESCO becomes a partner with the agency to improve, efficiently manage, and maintain a facility's energy consumption throughout the term of the contract.

ESCOs design projects to use state-of-the-art technologies. They also provide extensive training for facility operations personnel and provide or arrange for project financing. The cost of these services will be repaid over the contract term from the energy cost savings. In the event that the actual savings fall short of the guarantee, the ESCO is contractually liable to reimburse the agency for the shortfall.

Standard services offered by ESCOs under an energy performance contract include:

- An investment-grade technical energy audit that analyzes current building conditions, establishes base-year energy consumption, recommends energy conservation measures (ECMs), and calculates associated energy cost savings
- A sound technical project, which includes capital equipment and ongoing energy services
- Project engineering and design
- Tax-exempt project financing guidance and options
- Construction bonding to comply with statutory and agency requirements
- Equipment acquisition
- Complete project installation and construction management
- Guaranteed savings for the life of the contract
- Project commissioning
- Savings measurement and verification
- Project monitoring services
- On-going equipment service and maintenance (if needed)
- Extensive training for building operators and facility personnel

Project Site Selection

There are a number of technical factors to consider when selecting a suitable project site for an EPC energy project. In general, the facility should have high annual energy use, coupled with sufficient energy saving opportunities to generate the necessary cash flow to amortize all project costs over the contract term and attract ESCOs' interest. Some ESCOs are willing to implement projects for smaller facilities, but they make those decisions on a case-by-case basis.

A facility that makes a good candidate for EPC will possess most of the following characteristics:

- Annual utility costs in excess of \$300,000
- Potential annual energy savings from \$45,000 to \$75,000 (15% to 25% of the project cost)
- Stable facility use and occupancy
- Consistent energy-use patterns over several years
- Access to several years of utility records
- A structurally-sound facility with no extensive building renovations planned, nor recently completed

Often, it makes economic sense to combine several facilities into a single project offering. Multiple building projects with excessive energy costs are usually very attractive to ESCOs and allow the agency to finance and obtain a greater number of energy improvements through a single procurement.

A simple rule of thumb to consider when selecting candidate project sites:

The larger the annual energy costs and potential for savings, the greater the opportunity for both parties to benefit from energy performance contracting.

Features of Energy Savings Guarantees

Since expected energy cost savings must pay for all project costs over the term of the contract, ESCOs have a strong financial incentive to design optimal-performing projects. In addition, payment of ongoing ESCO service fees (e.g., maintenance services, project monitoring, savings measurement and verification, etc.) must also be paid from the facility savings. Therefore, if savings are not achieved, the ESCO does not get paid.

At a minimum, any savings guarantee should meet the annual debt service payments (e.g., tax-exempt lease, bonds, bank loan, etc.) and any ongoing ESCO service fees for project monitoring. Typically, these savings guarantees are structured to be 85-90 percent or more of the predicted savings.

Savings guarantees are generally expressed in both dollars and fuel units. The dollar value attributed to fuel units should be the prevailing utility rate for that particular fuel at the time of contract execution. It is standard practice for ESCOs to establish the prevailing unit utility rate as a "floor rate" from which the dollar value of savings will not fall. This "floor rate" protects the ESCO from future projected savings devaluation should utility rates drop during the contract term. This structure assumes that if utility rates fall, the facility will immediately benefit from an overall reduction in utility costs.

However the savings guarantee is structured, it is critical that both parties agree to and thoroughly understand the terms of the guarantee and how it will be applied throughout the contract term.

Benefits of Energy Performance Contracts

In addition to the savings guarantee, there are a number of other benefits for public agencies using EPC to implement capital energy projects:

- Preserves limited budget dollars for other services and activities
- Allows agencies to implement comprehensive capital energy projects and avoid a "piecemeal" approach to bidding and managing separate project components

(see Figure 1-3 for a comparison of conventional bid and spec vs. EPC procurement)

- Finances capital energy improvements from utility savings
- Reduces frequency of repairs and maintenance costs for inadequate, aging, or obsolete equipment
- Provides operating personnel with technical training
- Decreases indoor air quality (IAQ) problems
- Creates a more comfortable work environment and increases employee productivity
- Enhances the local economy with the ESCOs' use of local subcontractors
- Creates an incentive for ESCOs to develop efficient projects, since compensation is linked to project savings
- Improves the environment and conserves scarce energy resources

FIGURE 1-3

Comparison of Conventional Bid and Specification
vs. EPC Procurement

| Conventional Bid & Spec Procurement | Energy Performance Contracts: Competitive Negotiations for Professional Services |
|---|---|
| <ul style="list-style-type: none"> • Requires several years to secure sufficient funds to implement comprehensive energy projects • Piecemeal approach to bidding and managing separate project components results in high staff costs • Multiple contracts with multiple vendors can result in conflicting project requirements • No guaranteed energy savings • Comfort and operating standards usually are not offered by equipment vendors • Incremental project implementation misses savings design opportunities • Energy projects must compete for limited budget resources with other improvement projects • No direct incentive for building staff to reduce energy costs • Limited staff expertise and resources may put project performance at risk • Under-funded operations and maintenance typically result in wasted energy | <ul style="list-style-type: none"> • All funds needed for a comprehensive energy project are readily available • Lower staff costs and quicker completion of a comprehensive project • Single contract with single point accountability for project performance • ESCO guaranteed long-term energy savings • Energy performance contracts typically contain explicit comfort and operating standards • Comprehensive project implementation maximizes savings design opportunities • Energy projects are funded with utility bill savings • ESCO payments are tied to achieving energy cost savings over the contract term • ESCO provides ongoing technical expertise to insure project performance • EPC projects generate energy cost savings to finance the operation and maintenance required to sustain long-term project performance |

Project Financing

In general, it is more economical for public agencies to secure their own project financing and to require an ESCO financial guarantee that covers the annual debt service from the project energy cost savings. The tax-exempt status granted to a public agency enables it to access lower-cost financing than that typically available to an ESCO. Tax-exempt lease financing generally offers more favorable financing terms that can enhance the potential scope of work and reduce the overall cost of the project.

Project Financing Considerations

There are a number of factors to consider when assessing financing options for EPC projects:

- Size of project investment
- Length of financing term
- Source of funds (e.g., bonds, tax-exempt lease, commercial lease, ESCO corporate fund or line of credit, etc.)
- Interest rate
- Flexibility of financing instrument to fund project "soft costs" (e.g., design, engineering, construction management, etc.)
- Creditworthiness of the agency and ESCO
- Length of construction period
- Construction financing options/interest rate
- Equipment ownership
- Buy-out schedule
- Required security interest/project collateral
- Project bonding requirements
- Risk premium charges for ESCO financing (if applicable)
- Preferred project repayment schedule (e.g., monthly, quarterly, annually)
- Ability to time the debt repayment schedule to coincide with the guarantee period

Available Sources of Project Financing

One of the primary benefits of EPC is the ESCOs' savings guarantee. This guarantee makes the ESCO financially liable for any project performance savings shortfall. If the guaranteed level of savings does not materialize, the ESCO is contractually bound to reimburse the agency for the difference between the actual savings and the guaranteed savings. This feature reduces the agency's financial risk.

There are a variety of sources available to public agencies for financing EPC projects. Since public agencies are tax-exempt, it makes economic sense to use some method of tax-exempt financing. Most ESCOs offer to assist with project financing arrangements since many ESCOs have established relationships with financial institutions willing to provide financing. While the repayment obligation resides with the agency, the ESCO should provide a guarantee that the agency's annual financial obligation will be met during the contract duration, regardless of the financing method chosen.

The primary project financing sources available to public agencies include:

General Obligation (G.O.) Bonds

These are typically the least expensive source of funds available for agencies with the authority to issue general obligation bonds. The bonds are attractive to the financial market because they are backed by the full-faith and credit of the issuer. This means that the issuer pledges its authority to tax, raise, and collect sufficient funds to satisfy the bond obligations. There have been a number of instances where energy projects have been financed as a part of a larger G.O. bond issue that included other capital projects. In those cases, the project costs were paid outright and the energy performance contract was structured to provide a guarantee that corresponds to the bond retirement schedule agreed to by both parties.

While general obligation bonds offer the lowest interest rates, there are statutory debt restrictions that limit their availability. Approval to issue the bonds must be obtained by the state legislature or by public referendum. This can impose project implementation delays. Also, the financing of capital energy projects must compete with the financing of other essential government services and capital project needs.

Revenue Bonds

Revenue bonds are another option for energy project financing. They carry attractive interest rates, although the rates are slightly higher than G.O. bonds. Also, revenue bonds are not backed by the full faith and credit of the institution and are, therefore, considered a method of "off-budget" financing. In addition, revenue bonds require the identification and availability of a dedicated revenue source to retire the bond debt. While guaranteed savings would appear to fulfill that requirement, energy savings are not considered actual revenue by the financial markets. Appropriated payments dedicated specifically to revenue bond retirement would have to be secured to fulfill the revenue obligation. Approval by the state legislature or public referendum often is required prior to issuing revenue bonds; however, there is rarely a statutory limitation on the use of such bonds for public use. Similar to G.O. bonds, the performance contract would guarantee the retirement of the revenue bonds on a schedule agreed to by both parties.

Tax-exempt Lease Purchase

The use of tax-exempt lease financing is the most common method used by public agencies to finance EPC projects. The interest rates associated with tax-exempt lease financing are significantly lower than commercial lease-purchase interest rates because the interest payments are considered to be tax-exempt income to the investor. A tax-exempt lease typically does not require public approval or constitute a long-term debt obligation for the agency. This type of financing also allows the agency to retain the equipment title with an equipment security interest held by the investors. The ESCO industry and financial institutions typically accept lease payments subject to annual appropriations with a standard non-appropriations provision included in the lease agreement. The ready access to tax-exempt lease financing makes this method the most attractive and commonly used method of financing EPC projects by public agencies.

Bank Financing

A conventional installment-payment loan obtained from a local bank or financial institution also can be used to finance an EPC project. Depending upon the agency's relationship with the bank, interest rates and contract terms could be negotiated to make this an attractive and economical means of project financing. Under an installment payment loan, the bank retains title to the equipment for the loan term. At the conclusion

of the loan term, the title is turned over to the agency subject to the agreed-upon terms. This type of financing is considered a long-term debt obligation and is credited against the agency's outstanding debt limitation.

ESCO Financing (Commercial Leases, Internal Corporate Funds or Credit Lines)

ESCO financing is generally the most expensive financing available for EPC projects - particularly for tax-exempt public agencies. Since ESCOs do not have direct access to tax-exempt financing sources, they must use commercial sources or their own internal funds or credit lines. Commercial credit lines carry higher interest rates. Also, using an ESCO's internal corporate fund is subject to required rates of return for corporate shareholders. Additional financial risk premiums may be charged to the project in exchange for the ESCO bearing all the financial risks associated with project repayment. The high cost of ESCO financing can impose limitations on the technical scope of the project and may place restrictive conditions on the terms of the energy performance contract.

PART 2: PROCUREMENT PROCESS

Overview

Mississippi's public agencies and private nonprofit hospitals are required to use a *Request for Qualifications (RFQ)* when procuring energy performance contracts. An RFQ is used to solicit and invite written submissions of qualifications from ESCOs that are capable of implementing EPC projects.

The Mississippi Development Authority-Energy Division (MDA-ED) has promulgated policies and procedures for energy performance contracting projects in accordance with §31-7-14 of the Mississippi Code of 1972, as amended, which require that an agency notify the MDA-ED in writing that it intends to issue an RFQ to develop an energy performance contracting project. Copies of the MDA-ED's *Energy Performance Contracting Policies and Procedures* and their *Step-By-Step Process For Implementing Energy Performance Contracting Projects in Mississippi* are included in Appendix A.

The agency may also request MDA to review its RFQ, as well as provide technical assistance throughout the process.

The following is a step-by-step description of the procurement process. (*A Request for Qualifications (RFQ) for Energy Performance Contracting Services* is included in Appendix B.)

- Agency Publicly Advertises for Responses to the RFQ: Agencies are required to advertise once each week for two consecutive weeks in a regular newspaper published in the county or municipality where the agency is located.
- Agencies Receive ESCOs Written Responses to the RFQ: The ESCOs written responses should include information on their corporate background and technical qualifications, past projects, client references, and their proposed

approaches to the agency's project. This information will be used to investigate, evaluate, score, and rank the ESCOs' responses. Client references are checked concurrently with the review and ranking of RFQ responses. The combined written proposal and client reference scores may be used to shortlist the highest ranking firms that will be invited to participate in the oral interviews.

- Oral Interviews of Short-listed ESCOs: Oral interviews provide a valuable means of obtaining additional information from competing ESCOs. These interviews allow the agency to review each ESCOs project approach and give the ESCOs an opportunity to more fully respond to questions from the evaluation team.
- ESCO Selection: Final selection is the last step in the procurement process. Selection of the best-qualified ESCO should be based on the cumulative scores of the written proposals, client references, oral interviews, and consensus of the evaluation team. The highest ranked ESCO is then recommended for selection.

After receiving the necessary administrative approvals for project commencement, the investment grade technical energy audit agreement -- which authorizes the ESCO to conduct a complete technical and economic analysis of the facility(ies) - is executed. This investment-grade energy audit produces a report which details the ESCO's final list of energy improvements for installation, a complete description of services it will provide, complete contract terms and conditions, a project timetable, and all energy cost savings projections associated with the project.

It is important for the agency to rigorously review and verify the results of the energy audit conducted by the ESCO. Whether technical consultants or in-house technical personnel verify the audit results, all components of the proposed and final technical scopes of the project should be thoroughly reviewed prior to the execution of the Energy Services Agreement (ESA). The Information gathered during the audit process is the basis for the negotiation of the final scope of work and ESCO services, and for final contractual terms and conditions. It should be clearly understood that the agency is responsible for the cost of the energy audit if they are unable or choose not to proceed with the final EPC contract. If the agency decides to proceed with the project, the cost of the audit will be rolled into the project financing and amortized over

the project term. Each ESCO's cost for conducting the audit should be disclosed in its written response to the RFQ.

Preparing the Request for Qualifications (RFQ)

An RFQ should clearly define the project scope of services desired, delineate the steps in the procurement process, provide the projected project schedule, establish the evaluation criteria, detail the key contract terms and conditions, and establish the corporate and technical information to be submitted by the ESCOs in their responses. In addition, the RFQ should clearly state that achieved energy cost savings must be more than sufficient to cover all project costs for the duration of the contract term. This requirement establishes the economic bottom-line and financial performance requirements of the EPC project.

The type of information that should be requested from ESCOs in response to the RFQ can be found on the following page.

An RFQ needs to have sufficient information about the project to attract ESCOs' interest in implementing an EPC project in the issuing agency's facility(ies). The primary purpose of the RFQ is to give form and substance to the project and to create the ground rules by which competing ESCOs will have to comply.

The *Request for Qualifications (RFQ) for Energy Performance Contracting Services* located in Appendix B addresses the essential components common to most EPC arrangements. This sample has been designed for flexibility and can be easily customized to accommodate specific project needs and agency requirements. Project-specific procedures and information on the following topics -- site visits, project schedule and evaluation criteria -- need to be included in the final RFQ.

FIGURE 2-1

Key Information to Request

- Ø Experience with implementing performance contracting arrangements
- Ø Understanding of and experience with energy measures likely to be installed
- Ø Financial stability and experience with project financing
- Ø Background and EPC experience of all project personnel assigned to the project
- Ø Performance record of past EPC projects managed by the project team who will be assigned to the agency's project
- Ø Calculation methods used to compute base-year utility use and project savings
- Ø Savings measurement and verification and project monitoring methods
- Ø Proposed approach to ongoing maintenance and other services
- Ø Proposed structure for the savings guarantee and ESCO fee payments
- Ø Technical energy audit cost
- Ø Training services for the facility staff
- Ø Sample investment-grade technical energy audit, project commissioning plan, maintenance plan, and customer savings report

Site Visits

Most ESCOs will want to tour the facility(s) and interview facility staff prior to submitting any written responses. These site visits should be scheduled after the RFQ is issued but before responses are due. The facility(ies) should be available for individually scheduled tours during a specified period of time. It is recommended that each responding ESCO be scheduled to tour the site(s) separately.

Project Schedule

A project schedule should be developed that identifies specific procurement dates and activities. Figure 2-1 is a representative sample project schedule that is contained in the *Request for Qualifications (RFQ) for Energy Performance Contracting Services (Appendix B)*. The project schedule will help ESCOs understand the procurement schedule of the facility(ies) and serves as a guideline for keeping the project on-track.

FIGURE 2-1

Sample Project Schedule

| Activity | Timeframe |
|---|-------------|
| Advertise RFQ | Weeks 1 & 2 |
| Site Visit..... | Weeks 3-6 |
| RFQ Responses Due | Week 8 |
| Written Proposals/Client References Reviewed/Evaluated..... | Weeks 8-11 |
| Oral Interviews/Presentations | Week 12 |
| Anticipated Agency Approval Date..... | Week 14 |
| Investment Grade Technical Energy Audit Agreement Executed..... | Week 16 |
| ESCO Conducts Energy Audit..... | Weeks 16-32 |
| Audit Report Submitted | Week 32 |
| Contract Negotiations Finalized | Weeks 32-40 |
| Anticipated Date for Contract Approval and Execution | Week 40 |

Evaluation Criteria

It is important to specify the evaluation criteria to be used for ranking competing ESCOs. The *Sample Model RFQ* contains a detailed list of recommended evaluation criteria. These criteria are grouped into four major categories:

- 1) Experience
- 2) Approach to Project Management
- 3) Technical Capabilities & Expertise
- 4) Financial Strength

These categories are useful in aggregating evaluation data for the presentation of evaluation rankings.

Project Terms and Conditions

The *Project Terms and Conditions*, contained in Attachment C of the *Sample Model RFQ*, describes the minimum terms and conditions that will be accepted by the agency for the EPC project, and covers the key technical and contractual elements that should be included in a energy performance contract. These terms and conditions can be easily customized to incorporate all the project-specific technical and legal requirements and any agency policies with which the ESCO will have to comply.

Technical Facility Profile

A technical description of the project facility(ies) needs to be prepared to accompany the RFQ when it is issued. ESCOs will need enough technical details about the facility to adequately assess the opportunity to develop and implement a successful project. At a minimum, a brief description of the premises and all major energy-using equipment should be provided. Several years of past utility consumption data, preferably by fuel unit and cost, also should be included. Instructions for preparing this technical facility profile are included in the *Request for Qualifications (RFQ) for Energy Performance Contracting Services* located in Appendix B.

PART 3: EVALUATION PROCESS

Evaluation Team Identification

It is important to identify members of the evaluation team early in the procurement process in order to receive their input during the development of the RFQ scope and to keep them informed of the project progress. The evaluation team members also need to be made aware of the evaluation timetable so that they can schedule sufficient time to review written submissions, check client references, and participate in oral interviews. An evaluation team can involve any number of agency personnel, including but not limited to:

- Facility/Operating Engineers
- Maintenance Staff
- Purchasing Agent
- Energy Manager/Designated Project Manager
- Administrative/Financial Manager
- Legal Counsel
- Technical Advisors/Consultants

However the team is assembled, it is important to include individuals involved with daily facility operations during the entire procurement and evaluation process. It is also recommended that a liaison to staff (i.e., faculty member, medical staff, etc.) be included to keep other staff members apprised of the project status.

The role of this evaluation team will be to review and evaluate the submissions of competing ESCOs in order to select the most qualified company to implement the EPC project. It is likely that evaluation team members will have varying degrees of expertise and interests with regard to the project. Selecting a diverse technical, financial, and legal team allows the members of the evaluation team to share evaluation tasks (e.g., client reference checking,

reviews of sample energy audits and financial statements, etc.), as well as offers them the opportunity to address a wider variety of concerns and issues. It is recommended that specific evaluation criteria be assigned to individuals with matching expertise and that a minimum of two evaluators rank each criterion.

Evaluation Project Schedule

The evaluation of ESCOs written submissions, client references, and oral interviews is typically conducted over a period of six to eight weeks. The process can take up to three months, which includes obtaining all the necessary agency approval for the selection of the best and most qualified ESCO. The length of time needed depends on the following:

- The technical complexity of the project
- The number of ESCO responses received
- The agency's required approval processes

It is very important to include, in the RFQ, a project schedule that outlines the anticipated amount of time to be spent on each phase of the evaluation process. When establishing the evaluation schedule, also consider the time required for compiling evaluation data and generating ESCO rankings. (Please see Figure 3-6, *Sample Evaluation Schedule*.)

The evaluation methodology described in this manual is a three-phase process and includes:

- Phase 1 - Review of Written Submissions
- Phase 2 - Client Reference Checks
- Phase 3 - Oral Interviews

This evaluation methodology recommends using the combined scores from Phases 1 and 2 to shortlist the highest ranked ESCOs to participate in oral interviews.

Sample evaluation ranking forms for each phase of the evaluation process can be found in Appendix C. Each evaluation ranking form contains specific evaluation criteria and a range of point values from zero to five, with zero having the lowest value and five the highest.

It is recommended that the evaluation criteria be weighted to reflect its relative importance to the overall project goals. For example, the most important criteria could be weighted using a factor of three (e.g., a five point score would be valued at 15 points, a four point score valued at 12 points, etc.). Less important criteria would be weighted by a factor of two (e.g., a five point score would be valued at 10, etc.).

For all three phases of the evaluation process, the evaluation criteria has been aggregated and organized into the following four categories:

- Past Experience
- Project Management Approach
- Technical Capabilities & Expertise
- Financial Strength

These categories are useful for comparing the rankings of ESCOs in each category and in the presentation of evaluation data.

One important design feature of the evaluation methodology -- if specific criteria are not assigned to individual evaluation team members -- is the "Unable to Rank" category. The evaluator and/or client reference contact person should always choose this category if they have insufficient personal knowledge or experience to fairly rank a specific criterion. Checking "Unable to Rank" has no point value and therefore no impact (negative or positive) on the ESCO's overall score. This has been included to avoid unfairly penalizing or rewarding an ESCO for the evaluator's and/or client reference contact's lack of expertise or knowledge. On the other hand, a "Not Acceptable" ranking should be given when a response provided by the ESCO is insufficient, non-responsive or of poor quality. A "Not Acceptable" ranking does have a negative impact on point scoring.

It is extremely important to instruct the evaluation team members on the difference between the "Not Acceptable" and "Unable to Rank" categories. The distinction between these two categories must be emphasized and then used consistently in all phases of the evaluation process.

Figures 3-1 through 3-5 are sample bar charts that graphically illustrate how the cumulative scores from each phase of the evaluation could be presented and the rankings visually compared.

Evaluation Procedures

Phase 1: Written Submissions

The review written responses submitted by competing ESCOs, is the first phase of the evaluation. The written submissions provide the basic information for review and investigation throughout the selection process.

It is recommended that all written submissions be read before the evaluation team members begin their rankings. This initial reading familiarizes the evaluators with the content, how the information is presented and organized, and gives the evaluators a sense of qualification variations between competing ESCOs.

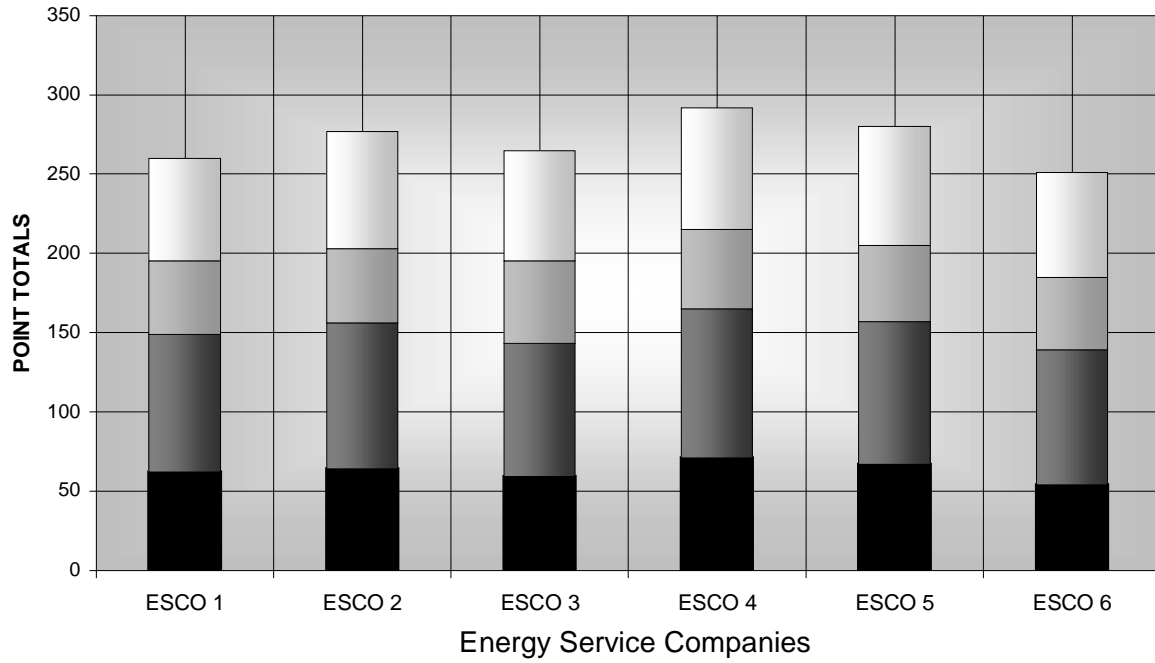
It is important to note that this is a comparative evaluation methodology. Team members will be ranking the competing field of ESCOs in comparison to each other, not to an abstract standard or ideal. A simple way to conduct these evaluations is with a side-by-side comparison of the written submissions. To assist evaluators in their comparative review, each criterion on the *Sample Form for Phase 1 Evaluation: Written Qualifications* located in Appendix C, may be indexed to identify where the relevant information is located.

Figure 3-1 is a sample bar chart that illustrates evaluation rankings from Phase 1 - Written Submissions from a field of six competing ESCOs.

FIGURE 3-1

Energy Performance Contracting Program
Sample Comparative Evaluation Rankings
Phase 1: Written Submissions

- Experience
- ▒ Management
- Technical
- Financial

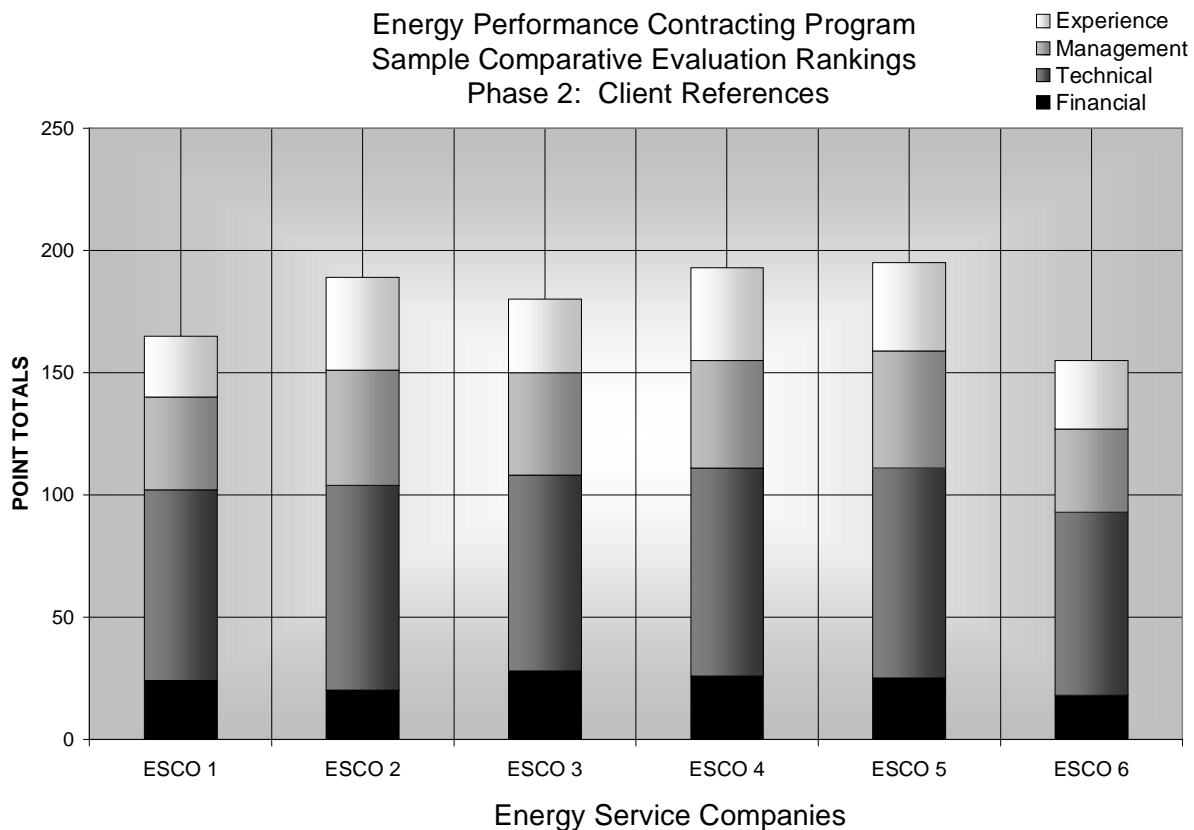


Phase 2: Client References

It is recommended that the evaluation of client references provided by the ESCO be conducted concurrently with the evaluation of written submissions. At least three telephone reference checks are recommended. Each phone call typically takes 10 to 15 minutes. Every reference should be asked the same set of prepared interview questions listed on the *Sample Form for Phase 2 Evaluation: Client Reference Checks* located in Appendix C. It is important to request that the responding reference rank the ESCO in accordance with the point values indicated on the form. This approach alleviates an evaluator's subjective interpretation of the reference's response.

Since each ESCO will provide a number of client references, the task of checking references can be distributed among the evaluation team members. This phase of the evaluation process is critical since client references provide specific information about the ESCO's past performance and their overall satisfaction with the project. Figure 3-2 illustrates the Phase 2 - Client References evaluation rankings from a field of six competing ESCOs.

FIGURE 3-2

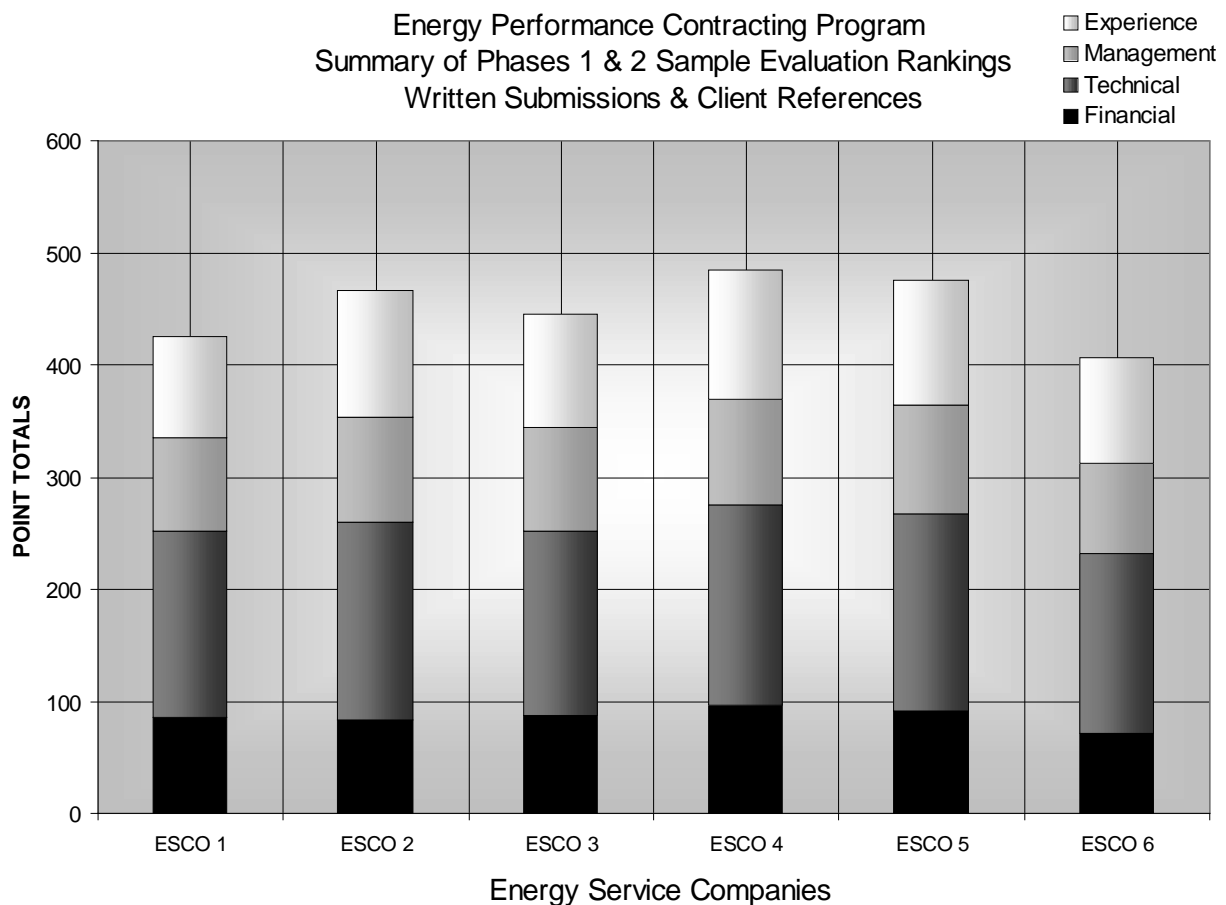


ESCO Shortlist

Once the tabulated results of Phases 1 and 2 are combined, the cumulative scores may be used to shortlist the highest ranking firms (three is recommended, if necessary). These firms then will be invited to participate in oral interviews. A *Sample Letter of Invitation to Oral Interviews* is located in Appendix C.

Figure 3-3 represents cumulative scores from Phases 1 and 2 for each of the six competing ESCOs. Based on these rankings, ESCOs 2, 4, and 5 will be shortlisted for participation in Phase 3 - Oral Interviews.

FIGURE 3-3



Phase 3: Oral Interviews

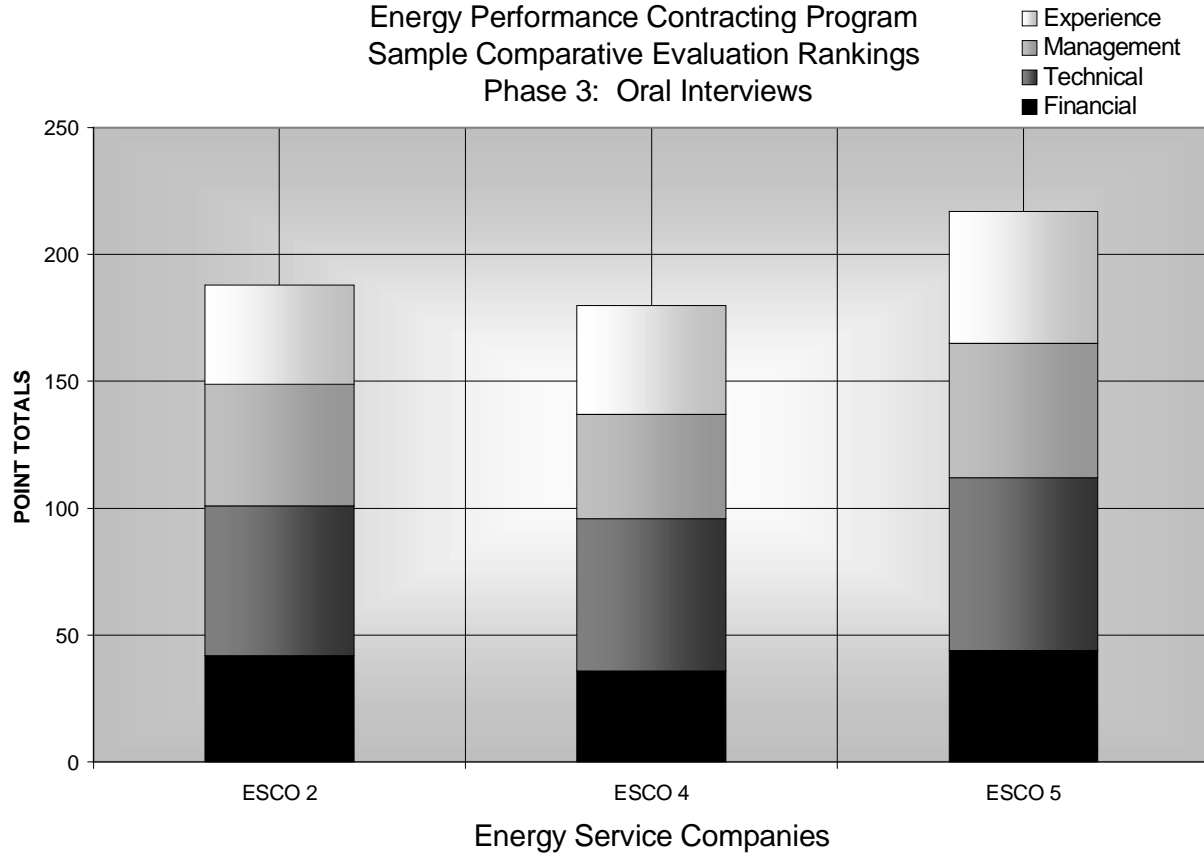
Each oral interview can range from one and a half hours to three hours in length. The interviews should be structured to allow for no more than a 20-minute formal presentation by each ESCO. The ESCOs should be told in advance of the presentation time schedule. The remaining time should be used for direct questions by the evaluation team.

It is recommended that two sets of questions be prepared in advance of the interviews. One set of questions should be asked of all ESCOs on a variety of topics. The second set of questions should be based on the specific information contained in each ESCO's submission or on other information gathered from client references. It is recommended that one team member be designated as the question facilitator. However, the format should be open enough so that all members of the evaluation team have the opportunity to ask questions as they arise.

It is suggested that each ESCO be ranked immediately following their oral interview. At the conclusion of all oral interviews, evaluators may re-rank the companies and discuss their impressions with other team members. *A Sample Form for Phase 3 Evaluation: Oral Interviews* is located in Appendix C. Figure 3-4 illustrates the evaluation results of Phase 3 - Oral Interviews from the three shortlisted ESCOs.

FIGURE 3-4

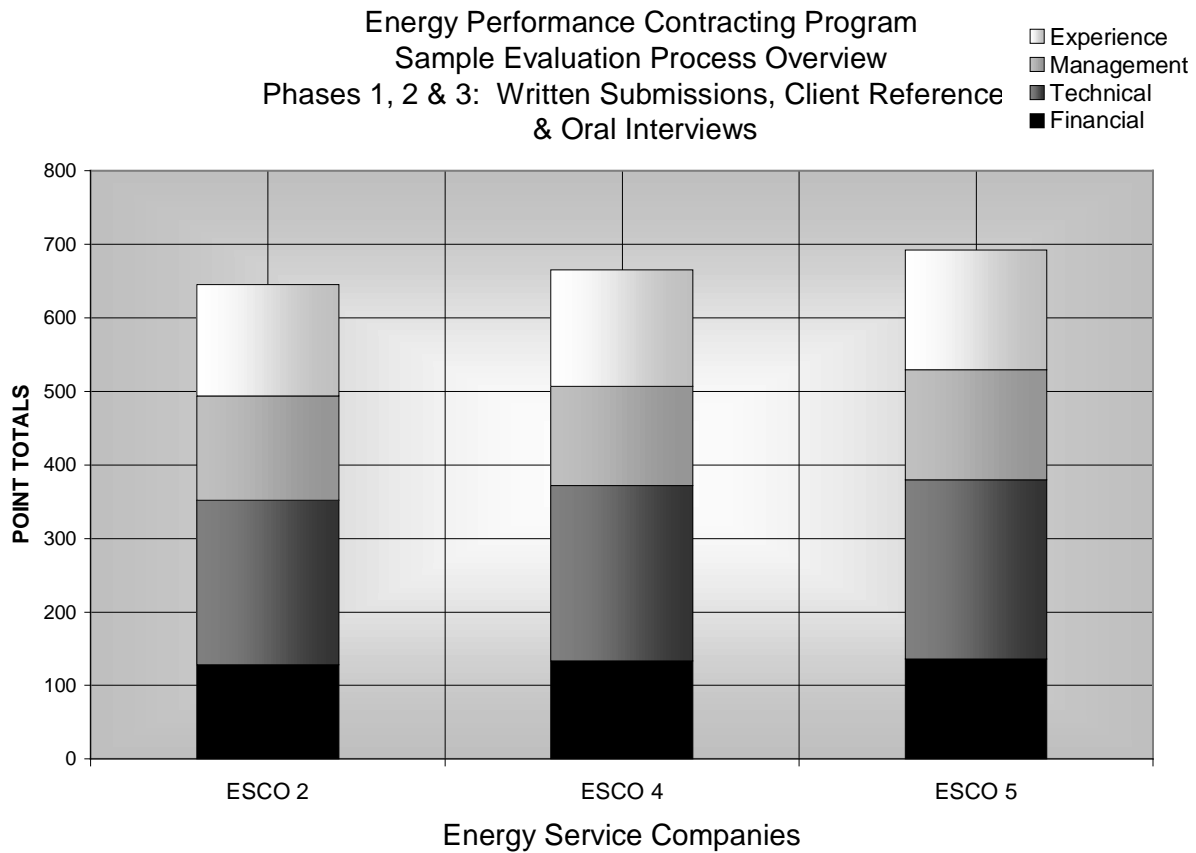
Energy Performance Contracting Program
Sample Comparative Evaluation Rankings
Phase 3: Oral Interviews



ESCO Selection

Ranking data collected from Phase 3 should be tabulated and added to the cumulative scores from Phases 1 and 2, resulting in the final ranking for each ESCO. At this point, a final evaluation team meeting is recommended in order to gain consensus for the final ESCO selection. Figure 3-5 illustrates final rankings from Phases 1, 2, and 3 of the evaluation process.

FIGURE 3-5



Tips for a Successful Evaluation

The following tips have been compiled to assist agencies in conducting a successful evaluation of ESCOs who respond to the RFQ.

- Ø Assemble a diverse evaluation team who will bring a broad-base of technical, financial, and legal expertise to the process
- Ø Weigh each criterion in accordance with its importance to the project (e.g., a weighted value of three for the most important criteria and a weighted value of two for less important criteria)
- Ø Briefly review all written submissions before ranking any submissions
- Ø Conduct a side-by-side comparison of written submissions
- Ø Check the "Unable to Rank" category if there is any uneasiness in evaluating any of the criteria
- Ø Check the "Unacceptable" category if the ESCO does not provide sufficient information or the information is of poor quality
- Ø Conduct a minimum of three client reference telephone checks for each ESCO
- Ø Ask client references to indicate a specific ranking in response to each criterion
- Ø Shortlist the highest ranking firms for participation in oral interviews, if applicable
- Ø Prepare two (2) sets of interview questions in advance of the oral interviews (general and the ESCO's proposed approach to the specific project)
- Ø Designate one evaluation team member to facilitate questioning
- Ø Limit formal ESCO presentations at the oral interviews to no more than 20-30 minutes
- Ø Gain consensus of the evaluation team in the final ESCO selection

Sample Evaluation Schedule

| <u>Activity</u> | <u>Timeframe</u> |
|---|------------------|
| Receive Written Responses to RFQ..... | Week 1 |
| Evaluate Written Responses (Phase 1) | Weeks 2-4 |
| Conduct Client Reference Checks (Phase 2) | Weeks 2-4 |
| Tabulate Phases 1 and 2 Rankings | Week 5 |
| Shortlist to the Highest Ranked ESCOs | Weeks 5-6 |
| Invite Shortlisted ESCOs to Oral Interviews..... | Weeks 5-6 |
| Conduct and Evaluate Oral Interviews (Phase 3) | Weeks 6-7 |
| Tabulate Phase 3 Rankings and Add to Rankings from Phases 1 and 2 | Weeks 7-8 |
| Select Highest Ranked ESCO to Proceed with Project | Week 8 |

PART 4: INVESTMENT GRADE ENERGY AUDIT & ENERGY SERVICES AGREEMENT

Audit Process

After the agency has approved selection of an ESCO, negotiation of the technical energy audit agreement begins. Once signed by both parties, this agreement authorizes the ESCO to conduct an audit. Under an EPC arrangement, the negotiated cost of the audit will be rolled into the project financing and repaid from the project savings. If the agency decides not to proceed with the project after the audit is completed, the agency is obligated to pay for the audit.

Since the audit results contain most of the information that will be incorporated into the final contract, the agency should conduct a rigorous technical review of the audit information before negotiating the final contract.

Appendix D includes a *Sample Investment Grade Energy Audit Contract*.

What are Investment Grade Audits?

An investment grade audit is the technical and economic foundation of a successful EPC project. The audit needs to provide sufficient technical detail so that a technically competent reviewer can effectively assess the ESCO's proposed project. The audit results must also establish and define a representative annual consumption baseline for all utilities and fuel types (e.g., gas, water, electric, etc.) to allow a realistic analysis of potential energy and cost savings.

At a minimum, an investment grade audit should include:

- For each proposed measure: cost, annual cost savings, annual maintenance cost impacts, simple payback, expected life and environmental impacts.
- A full analysis and definition of base year consumption for each fuel and utility type.
- A full description of the analysis methods, calculations, data inputs, and all technical and economic assumptions.

It is important that the ESCO conduct a thorough and comprehensive technical and economic facility analysis since this analysis serves as the basis for the project design and performance. The cost of an investment grade audit generally varies between 6 and 12 cents per square foot, but costs could be higher or lower depending on the complexity of existing equipment and the effort required for collecting accurate data. There are economies of scale, however, which can reduce audit costs per square foot in large facilities. For example, using representative sampling can eliminate the need for inspecting many similar pieces of equipment.

The time required to complete an investment grade audit varies by the facility size and complexity and data availability. Typically, the time to conduct an audit ranges from two to six months.

Challenges of Investment Grade Audits

There are a number of challenges to completing a quality audit:

- Missing or inaccurate utility consumption or cost data
- Inaccurate building operation and equipment load data
- Inaccurate estimates of utility savings
- Incomplete cost estimates for implementing the proposed measures
- Undocumented estimates of operation and maintenance savings
- Inaccurate accounting for interactive effects between energy saving measures
- Inadequate analysis of all feasible energy saving measures
- Limited field measurement to verify equipment operating parameters

Final Energy Performance Contract Overview

The final energy performance contract (also known as an energy services agreement or ESA) serves as the blueprint for how the project will operate over the contract term. This contract should clearly define each party's roles and responsibilities and should explicitly state how the project is expected and guaranteed to perform. The relationship between the agency and the ESCO - including who will do what, when, at what cost, and under what conditions - needs careful review. Due to the long-term nature of this relationship, the contract should be specific yet flexible enough to accommodate both current and future facility needs.

The main body of the contract frames the basic legal provisions and protections to which each party will conform. It specifies governing laws, contingent liabilities, conditions of default and remedies, regulatory requirements (e.g., insurance, labor and wage rates, minority/women business goals, code compliance, etc.), and indemnification provisions. The contract can be customized to accommodate additional terms and conditions as necessary.

A *Sample Energy Services Agreement* is located in Appendix E. This model contract is designed to illustrate the usual legal provisions and protections covered in an energy performance contract and included only as a guideline.

Individual projects and circumstances vary widely. Each state agency, local government (county or city), K-12 school, junior colleges, universities, and publicly-owned and private nonprofit hospital should consult appropriate legal counsel about individual ESCO projects and work closely with them to customize any of the contracting documents contained in this manual.

Contract Schedules

Contract schedules are referred to throughout the main body of the contract. These schedules contain specific details of the project negotiated between the agency and an ESCO. The schedules listed below are offered only as illustrative examples of the types of contract schedules that could be negotiated into the final contract:

- Schedule A: Equipment to be Installed

This schedule should specify newly installed equipment, including name of manufacturer, equipment quantity, and location. The schedule also should describe, if

applicable, any existing equipment modifications. New equipment warranties often are kept in a separate warranty schedule.

- **Schedule B: Energy Savings Guaranty**

This schedule fully describes all provisions and conditions of the savings guarantee provided by the ESCO. The guarantee should define the units of energy and dollars to be saved for the contract duration. Reference to the annual reconciliation of achieved vs. guaranteed savings should be included (Please see specific language in Section 3.4 of the *Sample Energy Services Agreement* regarding annual reconciliation, Appendix E).

- **Schedule C: Compensation to Company**

This schedule should cover the amount and frequency of payments that will be made to the ESCO for maintenance, monitoring, or other services negotiated as part of the contract. Schedule C also should contain information about how the compensation is calculated and if an annual inflation index will be used to escalate fees over the duration of the contract term. An hourly fee structure should be included to cover ESCO costs for any services provided beyond the scope agreed to at the time of contract execution.

- **Schedule D: Premises**

This schedule contains basic information about the condition of the premises at the time of contract execution. Such information would include facility square footage, construction type, use, occupancy, hours of operation, and any special conditions that may exist.

- **Schedule E: Calculation of Baseline/Benchmarks**

The baseline utility consumption is the yardstick by which project savings will be measured. The methodology and all supporting documentation used to calculate the base year, including unit consumption and current utility rates for each fuel type, should be located in this schedule. This schedule also may include base year documentation regarding other cost savings such as commodity savings (e.g., bulbs, ballasts, filters, chemicals, etc.) and cost savings associated with the elimination of outside maintenance contracts.

- **Schedule F: Financing Agreement**

An amortization and payment schedule from the lease financing agreement should be included in this section. A separate financing agreement will be executed with a third party lender.

- **Schedule G: Company Maintenance Responsibilities**

A complete description of the ESCO's specific operation and maintenance responsibilities, along with a timeline for these activities, should be included in this schedule.

- **Schedule H: Customer Maintenance Responsibilities**

This schedule describes the agency's operation and maintenance responsibilities that have been agreed to by both parties. In some instances, the schedule will contain no more than a description of routine operation and maintenance currently being performed on facility equipment. In other cases, facility staff may provide routine maintenance on newly-installed equipment, with the ESCO providing some specialized services on the same equipment.

- **Schedule I: ECMs Operating Parameters and Standards of Comfort and Service**

Schedule I contains explicit standards of comfort and levels of service for heating, cooling, lighting levels, hot water temperatures, humidity levels, and/or any special conditions for occupied and unoccupied areas of the facility. In addition, operating schedules for installed equipment should be specified in this schedule.

- **Schedule J: Company Training Responsibilities**

A description of the ESCO's facility staff training program should be contained in this schedule. The schedule also should include the duration and frequency of the training sessions, plus provisions for on-going training, commitments to train newly-hired facility personnel, and future training for equipment or software upgrades. Any fees associated with the agency's training requests beyond the contractual specifications should be provided in this schedule.

- **Schedule K: Project Installation Schedule**

Timetables and milestones for project installation should be contained in this schedule. If so desired, documentation of required insurance, subcontractor lists, and any MBE/WBE required subcontracts could be included in this schedule or broken out into a separate schedule.

NOTE: It is important that the construction/installation phase of the project be treated in compliance with individual agency requirements and the appropriate governing statutes. Since construction is just one component of the overall project, a separate construction contract may be desirable and, in some cases, necessary. The construction contract would then be referred to within the body of the contract and attached as an exhibit, appendix, or other type of attachment; or the appropriate construction language could be included in the body of the final contract. This decision should be made on a case-by-case basis. Sample construction contract language is contained in the *Model Energy Services Agreement* in Attachment A.

- **Schedule L: Current And Known Future Capital Projects at the Premises**

Information about the implementation of current or planned facility capital projects not included under this agreement should be contained in this schedule. This information could prove useful in later contract years by assisting in avoiding disputes over long-term savings performance, overall facility energy consumption, and associated energy costs.

- **Schedule M: Pre-Installation Equipment Inventory**

A pre-installation equipment inventory helps to identify which equipment was in place and how it was configured at the time of contract execution. This schedule is important to accurately establish the energy base year and savings measurement and may be necessary in referring to in later years of the contract.

- **Schedule N: Methods of Savings Measurement and Verification**

This schedule contains a description of the savings measurement, monitoring, and calculation and modeling procedures used to verify and compute the savings performance of the installed equipment. The calculation formula will include a method to compare the energy that would have been consumed if the EPC project had not been implemented (referred to as the "base year"), with the amount of energy actually used

over a specified time (monthly, quarterly, etc.). All methods of measuring savings, including engineered calculations, metering, equipment run times, pre- and post-installation measurements, etc., should be explicitly described for all equipment installed. The technical review and approval process for baseline adjustments also should be fully described in this schedule. Periodically, the baseline may be adjusted to account for changes in conditions that impact savings (e.g., weather, billing days, occupancy, etc.).

- **Schedule O: Systems Start-Up and Commissioning of ECMs**

This schedule should specify the performance testing procedures that will be used to start up and commission the installed equipment and total system. It also should provide for agency notification before all commissioning procedures. Schedule O should contain a provision for documenting the agency's commissioning attendance and for approval signatures that the commissioning tests followed the procedures specified and met or exceeded the expected results. Detailed specifications for these commissioning procedures should be developed during the project design phase.

- **Schedule P: Alternative Dispute Resolution (ADR)**

This schedule describes methods for resolving disputes or claims relating to construction or the ESA, wherein the parties agree to exercise good faith efforts (e.g., mediation, dispute resolution board) and to only use litigation as a last resort. This schedule is included as an alternative to costly binding arbitration and litigation. (See Appendix E, *Sample Energy Services Agreement* for sample ADR language.)

- **Schedule Q: Insurance and Bonds**

This schedule should contain evidence of each type of insurance policy and bond required by the agency to be obtained by the ESCO during all project phases.

- **Schedule R: Warranties**

This schedule should contain all of the manufacturers' equipment warranties, specifications, and procedures for invoking warranty provisions.

- Schedule S: Proposed Final Project Cost and Proposed Final Project Cash Flow Analysis

This schedule should contain a spreadsheet depiction of the expected financial performance of the project throughout the entire contract term. The documentation should clearly identify all financial components of the project, including interest rates, current fuel prices, any escalation rates, guaranteed savings figures, ESCO compensation figures, cash-flow projections, and projected *Net Present Value* of any cumulative positive cash flow benefits to the agency. Savings projections should be delineated by utility/fuel type and should identify ongoing annual service fees provided over the contract term. Project cost breakdowns should identify both hard costs (labor costs, subcontractor costs, cost of materials and equipment, and miscellaneous costs like permits, bonds taxes, insurance, mark-ups, overhead and profit, etc.). A suggested presentation format for this information can be found in the *Sample Investment Grade Energy Audit Contract* located in Appendix D.

Optional Contract Schedules

The following schedules can be included as either separate schedules or combined with the above schedules:

- Pre-Existing Service Contracts

Information regarding the scope and cost of pre-existing equipment service contracts may be located in this schedule. This gives both the agency and the ESCO information about how and when existing equipment service should occur. If the ESCO is credited with maintenance savings or if the ESCO is taking over existing service contracts, the scope and cost of these contracts will be useful for tracking the ESCO's performance.

- Facility Maintenance Checklist

This checklist assists the ESCO in tracking the agency's compliance with maintenance procedures performed by facility staff. The checklist typically specifies a simple list of tasks and a corresponding schedule for performing prescribed procedures. When facility staff completes the checklist, they forward it to the ESCO on a pre-established schedule (monthly, quarterly, etc). This checklist is a useful tool for both the agency and the ESCO to verify that the required maintenance activities are being performed at the scheduled intervals.

- Facility Changes Checklist

A facility changes checklist may be provided by the ESCO to assist the agency in notifying it when energy use changes occur (e.g., occupancy, new equipment acquisition, hours of use, etc.). This checklist is generally submitted to the ESCO on a monthly or quarterly basis.

Managing EPC Projects to Avoid Disputes

It should be a mutual goal of the agency and the ESCO to voluntarily resolve any performance problems that may arise. Because of cost and time delays, it is not advisable to delegate a technical dispute to attorneys or other “non-technical” individuals. But it is important to fully disclose all pertinent information and not allow frustration to result in the parties losing focus on the project value and their real and mutual interests.

Energy performance contracting projects require a cooperative effort between the agency and ESCO to achieve energy and cost saving goals, effective equipment maintenance and building comfort. Maintaining high quality performance results over a 15-year contract requires effective communication, a mutual understanding, and the fulfillment of contract responsibilities by both the agency and the ESCO.

The voluntary resolution of performance problems is facilitated when both parties are committed to seeking resolution based on good faith. Pertinent facts should be fully disclosed early in the resolution process, with the agency and the ESCO devoting sufficient time and resources to the proper evaluation of viable options. The agency and the ESCO must realistically evaluate the potential risk and cost of seeking legally binding involuntary resolution. Litigation and formal arbitration are usually very expensive and involve lengthy procedures by judges or arbitrators who often have inadequate expertise to understand complex technical issues. Alternative dispute resolution (ADR) that requires the use of mediation should be included as a standard contract provision to minimize the high cost of resolving performance problems.

To ensure a successful relationship and reduce the potential for conflict, the following should be considered:

- **Document and Explain Adjustments Made to the Base Year Projections**
Mutual duties need to be explicitly defined in the contract. Any contractual conditions that affect the savings guarantee must be realistic and technically sound. It is important to document and explain any adjustments made to the base year projections. If unsound technical data are used for project analysis and planning, there will be problems with the project performance.
- **Document Equipment Technical Performance Requirements**
Adequate staff training and accurate documentation of equipment technical performance requirements are a must for a successful project. Continuous monitoring and regular performance reviews provide important feedback to keep the project on track. Also, coordination of energy performance contracts with other construction projects helps to minimize conflicts between project goals.
- **Put All Project Changes IN WRITING**
It is important to keep thorough and precise written records of approvals for all changes to the project. Individual memories are often unreliable and staff turnover is unavoidable. The resolution of problems, through prompt and effective action by both the agency and the ESCO, is essential to avoiding disputes. Sound technical solutions, transparent to both parties, should satisfy the legitimate interests of both the agency and the ESCO. It is advisable to have a process in place to confirm, by mutual sign-off, that performance problems are solved.
- **Create Explicit Definitions of Technical and Economic Data and Performance Measurement Methods**
Since vague definitions of technical and economic data and methods of performance measurement invite misunderstanding and differing perceptions, it is important that clear definitions be provided. Definitions and contract standards should be fair, economically viable, technically sound, transparent, and mutually approved. All technical calculations should be double-checked for data input and math errors and fully documented to explain any base year adjustments.

- **Encourage Open and Timely Communication**
Regular, open, and timely communication between the ESCO and the agency staff charged with performance responsibilities is crucial to a project success, especially during project commissioning. Each party needs to fully describe project performance concerns and objectively evaluate the merits of available options in order to fairly and efficiently resolve performance problems.

PART 5: PROJECT COMMISSIONING

Project Commissioning Overview

Project commissioning is a systematic performance testing and quality control process designed to verify that newly installed equipment and systems operate according to the intended design and the agency's needs. Commissioning typically begins during the project design phase and continues for at least one year after construction is complete. It requires thorough documentation of system design, construction quality, functional performance tests, and operation and maintenance requirements.

The training of facility operators and staff is a key component of building commissioning since staff will be responsible for some equipment maintenance. If the ESCO has sufficient commissioning expertise, it is recommended to have the ESCO perform project commissioning since it is the most familiar with the technical details of the project. Over time, continuous commissioning is the best way to determine whether controls and equipment function properly.

Why Do Commissioning

Field studies show that building energy-systems rarely function to their full potential. Poorly designed systems, improper equipment selection, inferior equipment installation, insufficient maintenance, and improper system operation all reduce energy cost savings.

Typical problems in non-commissioned energy projects include:

- Serious air flow problems
- Poor documentation of project installation and operational requirements
- Underutilized energy management systems for optimum comfort and efficiency
- Incorrect lighting and equipment schedules
- Incorrect cooling and heating sequences

- Improperly installed or missing equipment
- Incorrect calibration of controls and sensors
- Lack of building operator training
- Short cycling of HVAC equipment
- Malfunctioning economizers

The value of commissioning has become more important in recent years because of the following:

- There is more diversity in the number of building specialized systems that need to be integrated.
- Building systems, especially building controls, are much more complex.
- HVAC systems are being designed with less excess capacity.
- Building and safety codes are becoming more stringent.
- There is wider recognition of the economic value of health and productivity benefits from properly operating buildings.
- Rising building operation costs make efficient operation more valuable.

EPC Project Commissioning Benefits

Depending on the complexity of the project, commissioning costs can range from five to ten cents per square foot. An investment in commissioning usually pays for itself in one to three years. Commissioning can reduce future equipment repair costs, downtime, and replacement costs by 15 percent or more. Detecting equipment performance problems while under warranty can reduce agency costs by getting equipment manufacturers and ESCOs to remedy any problems.

Benefits of commissioning include:

- Increased building staff knowledge and improved equipment operation
Project commissioning provides the agency the knowledge to optimize equipment, systems, and control efficiencies. Optimization improves coordination between building systems and, therefore, improves overall building performance. Improved systems control extends equipment life and improves operation efficiency by avoiding frequent equipment cycling.

- Better planning and coordination for smoother equipment start-up
During project construction, commissioning provides better planning, coordination, and communication between the agency and ESCO. This results in shorter punch lists, and fewer callbacks. Commissioning also provides faster and smoother equipment start-up due to systematic equipment and control testing procedures.
- Better up-front performance accountability
Since problem prevention is less expensive than problem correction, commissioning provides front-end performance accountability and quality control. This can provide quick feedback to design professionals on the dynamic performance of their design. Proper commissioning can also reduce liability risks from equipment failure.
- Improved building control and performance
Perhaps the most valuable benefit from commissioning comes from better building control and the assurance of improvements to thermal comfort and indoor air quality. This helps reduce occupant complaints and employee absenteeism, increase staff retention, and saves the agency money. While difficult to quantify, the health and productivity benefits of a comfortable building are likely worth more than five times the energy and operating cost savings.

Examples of Projects that Require Commissioning

- Boilers, Furnaces and Chillers
Check for proper sizing, controls, efficiency criteria, and performance testing
- Energy Management Systems
Conduct functional performance tests on control capabilities, review sensor locations and calibration, and thoroughly train system operators

- **Air and Water Distribution Systems**
Check fan and pump motor sizing, system alignment and control, air filtration, seasonal changeover procedures, and test and balance air and water delivery systems
- **Lighting Control Systems**
Conduct functional performance tests, control maintenance, and control calibration

How Commissioning Works

During project design, the agency needs to identify the facility's commissioning requirements. Effective commissioning requires the use of consistent performance criteria to guide the decision process from design through agency acceptance. The ESCO should review the design documents with the agency and, if applicable, incorporate the commissioning requirements into the bid specifications. From these requirements, the scope of the commissioning plan can be developed. The plan should include a commissioning schedule, all documentation requirements, and specific team member responsibilities. Commissioning activities need to be an integral part of the construction schedule.

Generally, pre-functional equipment checklists are used to evaluate proper equipment installation. Separate functional performance tests are used to verify proper equipment operation. Based on the results of functional performance tests, equipment is either accepted by the agency or performance deficiencies are corrected and then retested.

The ESCO should prepare a commissioning report that documents the commissioning process and a training manual for system operation and maintenance for submissions to the agency.

Model commissioning documents and specifications are available via the Internet from the Building Commissioning Association at <http://bcxa.org/resources/documents.shtm>.

Figure 5-1 highlights some of the key strategies for successful project commissioning.

Keys to Commissioning Success

- Ø Start early during project design and establish a commissioning schedule
- Ø Use an ESCO qualified to do commissioning or an outside commissioning expert
- Ø Develop a clear and detailed scope of work
- Ø Incorporate commissioning requirements into the subcontract specifications, if applicable
- Ø Require an initial planning meeting
- Ø Require regular progress reports
- Ø Make the commissioning process a high priority

RESOURCES

State

Mississippi Development Authority - Energy Division
<http://www.mississippi.org/content.aspx?url=/page/3395&>
(601) 359-6600

Mississippi Development Authority
<http://www.mississippi.org/>
501 North West Street
Jackson, Mississippi 39201
Mailing Address:
Post Office Box 849
Jackson, Mississippi 39205
(601) 359.3449

Federal

U.S. Department of Energy
<http://www.energy.gov/>

U.S. Department of Energy: Energy Efficiency and Renewable Energy
<http://www.eere.energy.gov/>

U.S. Department of Energy: Rebuild America Program
http://www.eere.energy.gov/buildings/program_areas/rebuild.html

U.S. Department of Energy: Federal Energy Management Program (FEMP)
<http://www1.eere.energy.gov/femp/>

U.S. Environmental Protection Agency: Energy Star Program
<http://www.energystar.gov/>

U.S. Green Building Council
<http://www.usgbc.org/>

Associations and Organizations

Alliance to Save Energy (ASE)
<http://www.ase.org/>

American Council for an Energy Efficient Economy (ACEEE)
<http://www.aceee.org/>

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

<http://www.ashrae.org/>

Association of Energy Engineers (AEE)

<http://www.aeecenter.org/>

Efficiency Valuation Organization (EVO)

<http://www.evo-world.org/>

International Performance Measurement Verification Protocol (IPMVP)

http://www.evo-world.org/index.php?option=com_content&task=view&id=61&Itemid=80

Energy Services Coalition (ESC)

<http://www.energyservicescoalition.org/>

National Association of State Energy Officials (NASEO)

1414 Prince Street, Suite 200

Alexandria, Virginia 22314

Phone: (703) 299-8800

<http://www.naseo.org/>

National Association of Energy Service Companies (NAESCO)

1615 M Street NW, Suite 800

Washington, DC 20036

202-822-0950

<http://www.naesco.org>

Sustainable Buildings Industry Council (SBIC)

<http://www.sbicouncil.org/>