Energy Savings Performance Contracting

A Guide for Oregon State Agencies

OREGON DEPARTMENT OF ENERGY

TABLE OF CONTENTS

ENERGY SAVINGS PERFORMANCE CONTRACTING GUIDE

Introduction

This guidebook is designed to assist state agencies in understanding, developing and implementing energy savings performance contracts. Energy performance contracting is considered a "tool" for pursuing cost-avoided energy savings through energy efficiency improvements. It is one of many approaches to take to achieve facility improvements and can be considered as one of the available options when planning for energy and facility operations savings.

Prequalification of ESCOs

HB 3612 of the 2008 legislative session amended ORS 276.900 - 276.915, giving the Oregon Department of Energy authority to establish and manage the qualifications criteria for selection of Energy Service Companies (ESCO) to perform Energy Savings Performance Contract (ESPC) services for State Agencies.

The Oregon Department of Energy has pre-qualified ESCOs for state agency projects; the list of pre-qualified ESCOs is provided at www.oregon.gov/energy/CONS/ESPC. All prequalified ESCOs must sign agreements with the Oregon Department of Energy and meet the requirements in the original request for qualifications (RFQ) to be eligible to propose for Agency projects.

Pre-qualification is the first step of a two-part process. The second step requires state agencies planning to enter into an ESPC to select only from the pre-qualified list.

The second step requires agencies to follow state procurement requirements and advertise a request for proposals (RFP) to a minimum of three firms from the pre-qualified list. Any acquisition by the state or any state agency, of a project using a financing agreement whose principal portion exceeds $100,000 must follow the procedures established in ORS 283.087 to 283.092[1]. The procedures outline the need for approval by the Oregon Department of Administrative Services (DAS), approval by the State Treasurer, and inclusion in the agency's biennial budget request for approval by the legislature.

[1] Refer to OARs 122-070-0000 through 122-070-0080 for more detailed information on rules implementing ORS 283.087– 283.092.

What is Energy Savings Performance Contracting?

Energy savings performance contracting is one method to purchase energy efficiency improvements in buildings. A single procurement is used to purchase a complete package of services in which one contractor is accountable for:

- Investigating existing conditions;
- Identifying energy saving opportunities;
- Designing EEMs;
- Purchasing and installing equipment;
- Managing selection, on-site activities (including inspection and permitting), and payment of subcontractors;
- Commissioning energy systems and improvements;
- Training staff to effectively operate the systems;
- Providing M&V of savings throughout the term of the contract; and
- Guaranteeing the energy savings.

A conventional process to purchase energy-efficiency improvements often requires three separate solicitations and contract awards. First, an agency solicits engineering services for an energy study. After reviewing the completed study, the facility selects the improvements to be implemented and solicits proposals for engineering design services. Once the designer completes the plans and specifications, the agency issues invitations for bids and then selects a contractor who will install the improvements.

Energy savings performance contracting can replace this collection of solicitations with a single RFP covering all aspects of the project and one set of contract documents with the selected ESCO. A single company takes responsibility for designing, installing, commissioning, and monitoring the improvements. The ESCO often employs a team of consultants and subcontractors to accomplish this, but the ESCO is still accountable for the ultimate success of the project. This single-source accountability makes the project easier to manage than a conventional construction project.

An ESPC may allow an agency to proceed with projects that tight budgets might otherwise prevent. Rather than wait for older inefficient equipment to fail, and costing more in the meantime, performance contracting allows for facility improvements to be budgeted out of future utility savings. At the discretion of the agency, all or a portion of the project costs can be financed, including up-front engineering, construction, and commissioning services. The agency receives new and updated equipment, the cost of which is offset by the avoided costs from the reduced energy usage. After the equipment cost has been paid off, the agency owns

the equipment and retains all of the savings from reduced utility bills. Even if the loan payments and payments to the ESCO offset much of the energy savings in the short run, upgrading equipment produces non-energy benefits, such as reduced maintenance and improved comfort and reliability.

The foundation of energy savings performance contracting is that the project should pay for itself from the energy savings.

Guaranteed Savings

Energy savings performance contracting, shifts much of the risk associated with an energy efficiency project from the agency to the ESCO, provided careful attention is given to the details when formulating the M&V plan and contract. This is usually accomplished by having the ESCO guarantee that savings will exceed loan payments. The savings are always based on energy units (amount of kWh, therms, Btus) saved, not dollars saved. If energy cost savings are less than the guaranteed savings (calculated using energy units saved multiplied by the baseline utility rate), the ESCO pays the difference to the agency. Because the agreement transfers the risk of project performance to the ESCO, the ESCO has a strong incentive for accurate savings estimations, high quality design and construction, preventive maintenance, and ongoing monitoring for the duration of the contract. It is important that an independent review of the M&V plan is conducted by a knowledgeable third party in order to minimize risk to the agency.

A clear understanding and agreement as to the method for guaranteeing savings is essential. It is also very important to review and agree on the circumstances that may affect or void savings guaranteed by the ESCO.

Depending on the energy measures selected for the project, the guarantee can be based on measured savings or calculated savings (stipulated). Using stipulated savings means that the ESCO and Agency agree to use a set value for a parameter throughout the term of the contract, regardless of the actual behavior of that parameter. In this case, the Agency assumes the risk for the parameters that are stipulated and has no recourse when the stipulated cost benefits are not achieved. In the event that the stipulated values overstate the savings, or reductions in use decrease the savings, the Agency must still pay the ESCO for the agreed-upon savings, according to the contract terms. If the actual savings are greater than expected, the Agency retains all of the surplus savings. When measured savings are used, the savings are verified based entirely on measurements, with the performance risk residing with the ESCO, who must show that the guaranteed savings have been realized.

Depending on the agreement, there may also be a mix of measured and stipulated savings. In this case, the ESCO assumes the risk for measured savings only, with the understanding that the obligations from any stipulated savings have been met.

Is an ESPC right for your facility?

ESPCs can be used to finance a wide variety of projects and services. However, not all projects or facilities have the right combination of needs and opportunities. Operational or technical barriers may make a performance contract difficult to implement.

Stability of building use and occupancy is very important to the economics of performance contracts. If past use is highly variable, developing a baseline is more difficult and savings may be hard to measure. If future facility use is uncertain, the projected savings of the EEMs may be too unreliable to qualify for financing. Due to the long-term nature of ESPCs, it is important that the project be consistent with the Agency's long-term master plan. For example, the possibility of a partial or complete facility closure before the expected end of the contract would make project financing difficult.

Evaluating technical potential helps ensure that the project potential is large enough to attract responsive proposals. From the proposers' point of view, the administrative costs to prepare a proposal, organize a project team, and arrange financing are almost the same for a small project as for a large one. As a result, proposers generally have a minimum threshold for the size of a project.

Some simple rules of thumb may be used to evaluate whether a facility has adequate potential to attract proposals for a performance contract:

- Projects with a total cost of less than $1,000,000 may not be feasible as a performance contract, because the administrative and other fixed costs involved in financing cannot be recovered in a reasonable period of time.
- The combined EEMs should have a simple payback less than the debt term, commonly at 15 years or less.

General Building Considerations

To determine if an ESPC is feasible for your building, a majority of the following statements should apply:

- Building occupancy has been stable in recent years.
- Building energy use has been stable or has been increasing in recent years.

- Annual energy costs for the facility (one or more buildings) exceed $100,000 per year.
- No large changes in occupancy, schedule, or major equipment are anticipated in the next ten years.
- The facility is unlikely to close or reduce its size or operating hours substantially in the next ten years.
- The facility is in good repair and significant amounts of hazardous materials, such as asbestos, are not likely to be disturbed by efficiency improvements.

If a facility does not have at least four of the above characteristics, it may not be a good candidate for an ESPC. Most owners can expect an ESCO to develop a project worth two to five times the amount of their annual utility expense.

Additional Considerations

When considering an ESPC, some additional key questions to evaluate include:

- Do you have a project champion and team to drive the project to completion?
- Will availability of capital financing be beneficial?
- Does the agency have in-house technical expertise to identify and scope the project or is external expertise required?
- Does the agency have contracting and construction management expertise?
- Does the agency have in-house personnel to maintain and operate the new equipment?

Preliminary Steps

Organizing a Project Team

ESPCs require the support and participation of many people for successful completion. To meet this need, it is recommended that a project team be formed early in the process. To organize a project team, first identify a team leader who will have overall responsibility for coordinating the team. Early in the development of the project, the team leader should recruit individuals who have expertise in the following areas:

- Facility operation and maintenance expertise to ensure that facility operating interests and knowledge are represented;
- Facilities and capital project planning experience;
- Technical expertise to evaluate energy efficiency potential, develop a scope of work, evaluate ESCO proposals, energy audits, the measurement and verification and

guarantee plan (recommend hiring a third party consultant if in-house expertise not available);
- Project management expertise—preferably the project manager that will oversee the project;
- Budget and finance; and
- Procurement, contract, and legal expertise to ensure that the process follows applicable procurement rules, review all contract terms, and assist in negotiations after a contractor has been selected.

In addition, participation and support from upper management, administration and building users will be vital for project success. Once the team has been chosen, define the roles and responsibilities of every team member and identify gaps that need to be filled. It is also recommended to prepare for personnel turnover by fully documenting the project process and agency decisions. Remember that documentation can be critical to clarifying the intent of the contract after time passes.

During the early stages of the project, it may be appropriate to simply provide team members with general information about energy savings performance contracting and the project status. A good start is holding an introductory briefing with all team members with the purpose of:

- Explaining the concept of energy savings performance contracting to all project team members;
- Building support for the project by describing facility needs that energy savings performance contracting will meet and the benefits expected to result from the project; and
- Describing the process and the intended schedule for each step so that the team members know what to expect.

The project team members (or at least the majority of the members) should also serve on the evaluation committee when the project reaches the point of contractor selection and throughout the project as an oversight group.

Previous Energy Audits

Determine if energy audits have been completed for your building in recent years. If so, review the audits for energy savings opportunities (measures not yet implemented) with an overall simple payback of 15 years or less.

If the building has not had a previous energy audit (or had one many years earlier or the information is out of date), you will need to determine the energy use and cost indices for your building. The EUI calculator is located on the ODOE ESPC website. http://www.oregon.gov/energy/CONS/ESPC/docs/EUI_Calculator_2016.xls. You can then "benchmark" your building by comparing it to similar buildings to determine the energy efficiency (or inefficiency) of your building. Buildings that are less efficient than similar buildings may have more opportunities and potential measures to be included in an ESPC.

Table 1
Sample Building Type EUIs Based on
ASHRAE Standard 100 Targets

Building Type	Energy Use Index (kBtu/sf/yr)	
	4C (Western Oregon)	5B (Eastern Oregon)
Government Office	50	52
Laboratory	179	187
Nursing Home/Assisted Living	84	88
Vehicle Service/Repair Shop	33	35

Preliminary Facility Evaluation

To begin the process, an evaluation of a facility's potential for energy efficiency improvements by the facility staff of the agency should be undertaken. A detailed facility evaluation can help win support for the project from maintenance staff, administrators, and building users. A Facility Profile form is located on the ODOE ESPC website. http://www.oregon.gov/energy/CONS/ESPC/docs/Facility_Profile.docx. In addition, knowledge gained during the evaluation can strengthen the agency's position in future discussions with ESCOs.

Performing an evaluation of existing conditions offers the following benefits:

- The Agency will have a better understanding of existing conditions and be better prepared to negotiate the energy use baseline;
- The Agency will be better prepared to suggest possible energy-saving improvements to proposers; and
- The Agency will be better prepared to evaluate proposed EEMs, technical approaches, and costs.

Using this evaluation will help your agency identify potential obstacles and opportunities. It is not recommended to pay for a detailed energy audit at this time. If you enter into an ESPC, an energy audit is typically the first activity undertaken.

Importance of Developing a Comprehensive Energy Savings Project

The comprehensive nature of performance contracts means that they need to incorporate improvements with both long and short term paybacks to be attractive to both the agency and the ESCO. The quick payback of retrofits such as lighting can be used to offset longer-term energy savings retrofits such as boilers, chillers, and windows. If a facility undertakes only the shorter payback measures first with more expensive upgrades postponed, the agency has then lost the opportunity to balance the cost of other important measures that have longer returns. The short term payback items provide immediate returns to the facility but "skim the cream" and may not represent the most appropriate energy savings measure package for the facility.

Generally, an ESCO should include any improvement expected to recover its project cost in energy savings over a specified period. It is recommended that the payback period for measures should not exceed the measure life of the equipment. This means that longer payback items, such as adding ceiling insulation or replacing windows, usually do not qualify on their own merits unless they are bundled with shorter payback items.

Typical EEMs using an ESPC include:

- Lighting upgrades
- Lighting controls
- HVAC (upgrades to heating, cooling, air handling equipment)
- Controls (energy management systems, building automation systems)
- Motors and variable frequency drives (VFD)
- Building envelope measures (insulation, windows, weatherization)
- Domestic hot water
- Water conservation
- Cogeneration
- Heat recovery

- Demand response
- Street & traffic lighting
- Renewables

Hiring an ESPC Consultant

We strongly recommend the hiring of a third party ESPC consultant to act as an Agency or Owner's Representative ("OR") for the development and implementation of the project, if that expertise is not available in-house. An ESPC project is a complex process requiring great attention to detail for its successful implementation. The use of an OR will support the ESPC process by providing the technical expertise required for ESPC project development.

It is important that the OR be hired at the very beginning of the process to work on behalf of the agency. The consultant should be knowledgeable and experienced with managing an ESPC project and possess a high degree of technical expertise in order to provide critical engineering oversight and understanding to the project. This is important to ensure that the ESPC project runs smoothly and efficiently, the engineering calculations and methodologies are reasonable and accurate and that the M&V methods used are understood by all parties and are reasonable and consistent with IPMVP[2] standards. This is the best way to ensure that the owner will realize the proposed project savings. Based on the importance of M&V, the Agency should rank M&V quality control experience and expertise in high regard when soliciting for an independent third-party OR.

The ESCO should reserve up to 5% of annually guaranteed savings for the Agency to hire an independent OR to review the ESCO's M&V reports and advise the Agency of compliance in measurement and verifying savings.

Project Financing

The chief goal of performance contracting is to offer an affordable mechanism for funding renovations out of resources already budgeted for energy use. This means operating under existing operational budgets and not competing with capital funding needed for other

[2] For detailed information on measurement and verification techniques, an electronic copy of the International Performance Measurement and Verification Protocol can be downloaded. A copy of the 2012 IPMVP can be found on the ODOE ESPC website: http://www.oregon.gov/energy/CONS/ESPC/docs/IPMVP_Vol%201_2012_EN-27.7.2012.pdf Warning—this document is large.

projects. Regardless of how the project is financed, the energy savings from an ESPC should first be used to service project debt.

The financial scope of the project is determined by the number and combined cost of renovations coming from a wide variety of energy saving categories. These improvements differ in expense, energy savings, and payback periods. Different financing strategies and combining renovations with both short and long term paybacks determines the length of the ESPC.

Before developing the RFP, the method of project financing must be considered. Commonly, Agencies will consider capital budget financing, state bonds (general obligation and revenue bonds), and loans or lease-purchase financing. The ESCO may help secure funding from a third party. Agencies also have the option of financing projects through the Oregon Department of Energy's Small Scale Energy Loan Program (SELP). The interest rates and fees of SELP may be lower than what third parties are able to offer. www.oregon.gov/energy/LOANS.

In addition, working closely with your local electric or gas utility companies during the development of an ESPC can result in significant financial incentives. Check with the utilities that serve your facility to determine if they have incentives that may apply to your project and can help lower project costs. Also, the ODOE Energy Incentive Program may offer incentives for some of the improvements: www.oregon.gov/energy/BUSINESS/Incentives. If eligible for incentives, the ESCO can be responsible for processing and ensuring receipt of utility incentives.

Once you have determined the method of financing your agency will use, you can then address project financing in the RFP. Agency financial and legal staff should help to develop the necessary language. The same staff should also be included later in review of contract documents, project invoices, and completion documents.

It is important to note that the financing agreement is a stand-alone agreement between the Agency and a financial organization, separate from the ESPC, and signed by the Agency at the same time as the performance contract. The two agreements are however linked through the payment schedules and the ESCO provided savings guarantee and show how the annual guaranteed savings meet the annual debt service (plus any related expenses imposed by the performance contract such as monitoring and verification).

ESPC Process Overview

If there appears to be potential for an ESPC and the project characteristics fit the General Building Considerations, the agency then prepares an RFP. The RFP should cover all engineering, equipment purchasing, construction, and commissioning needed to complete the project. The RFP must be offered to a minimum of three ESCOs on the Oregon Department of Energy pre-qualified list.

Issuing an RFP

Once the determination has been made to move forward with a project, the next step is to develop and issue the RFP. The goal of the RFP is to receive three or more responsive proposals with enough information to select one that best meets the needs of the Agency. ESCOs responding to the RFP will be evaluated on their site-specific approach to the proposed project, general approach to energy savings performance contracting, specific experience, and financial background. It is recommended that the ESCO selection process include interviews of the top scoring teams and a mandatory walk-through of the facility.

The agency will then award a contract to a single ESCO who will be accountable for all services and guarantees a level of savings for the facility.

Technical Energy Audit

Once selected, the ESCO should perform a detailed investment grade audit of energy efficiency opportunities at the facility with a Technical Energy Audit (also known as an "investment grade audit (IGA)") An IGA outline is located on the ODOE ESPC website. http://www.oregon.gov/energy/CONS/ESPC/docs/Investment_Grade_Audit_Outline.pdf . The cost of the energy audit is included in the project financing. However, after the audit is completed, the Agency may choose to install the upgrades on its own or not to proceed at all. If the Agency chooses not to use the performance contractor to complete the project, the Agency will be obligated to pay for the preparation of the energy audit. If the Agency chooses to proceed, the Agency should carefully review this audit and approve a final list of EEMs.

Project Development Plan

The ESCO then prepares preliminary plans and specifications (Phase 1 Part B - PDP) that the Agency reviews and approves. It is best practice to sit down with the ESCO and project team to review draft plans, design drawings, and proposed equipment specifications. Making incorrect design decisions or assumptions during this process is one the major technical risks during an ESPC process. Therefore, the Agency should spend as much time as is necessary to ensure that

the documentation of existing conditions is correct, equipment sizing and design is accurate, and the scope of work and installation plan is well-detailed.

The plan will also include important items related to schedules, safety concerns, and management of construction work (permitting and inspection) and subcontractors. The Agency may have past experience or preference related to the selection of subcontractors. If so, the Agency and ESCO should discuss the bid and selection process for any sub-contractor activities. A master schedule should include not only work start and end dates, but dates for inspection, staging, delivery, and facility closures, if any. Being that the ESPC may include a variety of measures that may overlap in timelines and facilities, careful coordination is needed. Establishing a strong line of communication with the ESCO's project manager who will be responsible for day-to-day implementation is critical. Daily reports and corrective action reports should be used to document work activities. It is also very important to carefully review the Commissioning and M&V Plans prior to implementation.

Project Implementation

After receiving a Notice to Proceed, the ESCO furnishes, installs, and commissions the energy efficiency improvements. It is highly recommended that the Agency monitor the day-to-day performance of the ESCO during the construction phase (Phase 2 - Construction) in the same manner as any capital improvement project. During heavy work periods, start or end of day meetings with the project leader is recommended. As projects are close to Final Closeout, the ESCO will perform commissioning, which includes verification of system installation and operating parameters, training of operations and maintenance staff, providing equipment manuals and documentation, and all warranty information.

Measurement & Verification

The project "Performance Period" will depend upon the measures implemented and the duration of testing required to demonstrate that the guaranteed performance is achieved as outlined in the contract. The ESPC should detail when the performance period begins and ends. A minimum performance period of 12 months is typical. The M&V performance period should begin when all the construction work is complete including controls programming and seasonal commissioning of equipment. The Agency reviews equipment operation and measurement and verification reports to ensure project performance for standards of comfort are met and that guaranteed energy savings are achieved.

Operations and Maintenance Services

In addition to equipment installation, documentation, and agency staff training, the ESCO may propose various repair and maintenance services. Often ESCOs propose repairs to existing

systems and also may offer to take responsibility for long-term maintenance and repairs to all new equipment installed during the term of the contract. The contractor or sub-contractor may also offer to take responsibility for maintenance and even operation of existing equipment.

OAR 330-130-0090 prohibits combining service agreements with an ESPC contract, requiring service agreements and contracts to be mutually exclusive. It is a requirement that any additional repair work or any long-term maintenance contract be separate from the ESPC.

One of the main benefits of an ESPC is that the project should pay for itself in energy savings, which may not be the case if an agency enters into a long-term maintenance agreement. As part of the M&V/ESG, some maintenance and repair is required as long as the guarantee is in place. However, it is recommended that the cost-effectiveness of continued M&V/ESG services be evaluated within three to five years of contract completion if the equipment is working as planned and the energy savings are being achieved.

Requesting Proposals

Below is an overview of a few of the major required elements in the RFP:

Schedule of Events - This should include dates of all important activities associated with the RFP, such as the requirement to attend a pre-proposal facility walk-through or conference, schedules for the site visit, proposal due dates, announcement of award, etc.

Building(s) included in the project - Clearly identify the facilities that will be part of the project. If there are buildings or building areas that will be excluded due to special operating requirements, security issues, or other reasons, be sure to identify those buildings or areas. In addition, complete the Facility Profile, for each facility to be included. A Facility Profile form is located on the ODOE ESPC website http://www.oregon.gov/energy/CONS/ESPC/docs/Facility_Profile.docx

Providing complete information will allow the ESCO to evaluate the potential of the facility before deciding to submit a proposal for a project. Providing clear, complete information about the facility in the RFP should both reduce the number of questions that must be answered later and increase the chance of receiving responsive proposals from interested ESCOs.

General Services Required - It's important for the agency to clearly articulate the services being requested and the general results required.

Typically, an ESPC calls for a comprehensive package of services, including:

- A TEA of energy efficiency potential;
- Design, procurement, installation, construction of energy efficiency improvements;
- Commissioning of the project;
- Measurement and verification of energy savings; and
- Energy Savings Guarantee.

As in any contract for services, be as detailed and specific as possible. It is also important to keep the focus on results, rather than on methods. Since ESCOs guarantee the results of their work, they commonly will determine and implement their own methods. Their track record is a key factor in the selection. Include a requirement to list at least three references from projects that the ESCO has completed in the past. It is recommended that the projects have been completed within the last 5 years and that the first-year expected and actual savings of the project be included. The comparison of estimated savings to actual savings will indicate the ESCO's ability to meet the guarantee.

A Sample RFP is located on the ODOE ESPC website.
http://www.oregon.gov/energy/CONS/ESPC/docs/Sample_Tier2_RFP_for_ESPC.docx

Evaluation of Proposals

The goal of the evaluation process is to identify the proposal that offers the greatest benefits to the Agency. The process described in this chapter is intended to address the unique circumstances of an energy savings performance contracting solicitation.

The Evaluation Committee

For ESPCs, proposal evaluation requires knowledge and expertise in diverse areas, including energy-efficient design, finance, and facility management. Effective evaluation also requires first-hand knowledge of the facility's needs and operations. It is important to include facility maintenance and planning staff as evaluators as they bring essential knowledge of on-site conditions and will also work with the selected ESCO during the implementation of the project. Including them in the selection process strengthens their commitment to the success of the project.

It is recommended that the evaluation committee be made up of all or a majority of the members of the Project Team since all of the same expertise is required. If the Agency chooses

not to use the Project Team in the evaluation process, it is important to include one or more members representing each of the following areas:

- Facility management
- Facility operations and maintenance
- Technical energy efficiency expertise
- Procurement and contracting
- Project management

Evaluation of Proposals

Proposal Scoring

Development of a solid evaluation criteria is critical to selecting the best ESCO based on measurable quality and technical and financial metrics. Otherwise the decision may be subjective, based only on the contractor's performance during the interview process without verifiable supporting documentation.

A sample score sheet has been developed to facilitate the evaluation process. The score sheet is located in Attachment E of the Sample RFP, located on the ODOE ESPC website http://www.oregon.gov/energy/CONS/ESPC/docs/Sample_Tier2_RFP_for_ESPC.docx. When scoring the proposers' general qualifications, the evaluator should review each of the proposals to determine how well the specific items listed for consideration in the RFP were answered.

Some questions to consider when evaluating the proposal:

- Is the expertise and experience clearly identified for staff assigned to the project?
- Is responsibility for each project task clearly assigned to a specific individual?
- Does the availability of staff resources seem sufficient for the proposed project?

Each proposal should be judged against each of the specific criteria listed in the RFP. Carefully review which evaluation factors and selection criteria to use in the RFP. Evaluation factors should be weighted to reflect the agency's priorities rather than all factors being weighted equally.

Contract Award

The Agency notifies all ESCOs in writing that the Agency intends to award an ESPC to the selected ESCO subject to successful negotiation of any negotiable provisions. The Agency may also award the contract for less than the full scope defined in the RFP.

Preparing the Contract Documents

ESPCs usually affect capital equipment essential to the Agency's mission and can easily involve total investments in millions of dollars. The contract establishes a long-term relationship between the Agency and ESCO, and agencies should develop terms to address potential issues with great care. If the contract language is crafted properly, this can virtually eliminate the financial risk of equipment failing to perform as promised.

The ultimate goal of the contracting process is to reach an agreement that is equitable to both parties, protects the interests of the Agency, and is so clear that any third parties reading the contract will interpret it the same way.

Phases of an ESPC

In an ESPC, the ESCO will perform services in several different areas. The ESCO provides expertise based on its experience in the field and a network of vendor relationships from similar projects elsewhere. Execution of the ESPC begins the first of three phases. Each phase of the contract is independent, has its own scope of work, time schedule, distinct contractual requirements, and compensation, all of which is discussed below. A Sample ESPC is located on the ODOE ESPC website. http://www.oregon.gov/energy/CONS/ESPC/docs/Sample_ESPC.docx

Phase 1, Part A - Technical Energy Audit (TEA)

The Agency and the ESCO execute the ESPC, Phase 1 Part A - TEA. The TEA is an investment grade analysis that will identify all EEMs with roughly a 1 to 15-year Simple Payback. The audit contract identifies the commencement date and required completion date of the audit. The contract scope of work details the parameters that must be covered in the audit. It also addresses the Agency's role in assisting the ESCO. The contract also covers compensation (fixed fee) to the ESCO, including fees payable upon early termination of the contract. If the Agency decides to terminate the contract during the audit or after audit completion, the Agency is liable for payment of services performed. If the ESCO decides, at any time during the audit, that estimated savings are not adequate to warrant a project, the ESCO may terminate the contract at no cost to the Owner.

The TEA should be investment grade which means that the energy savings and project cost estimates should be accurate to within 10%. This means that the actual project costs should

not deviate more than 10% from TEA phase to the actual Guaranteed Maximum Price (GMP) provided in the PDP. *This is important because the Agency will be making the decision to move forward with the Project Development Plan based on the TEA results.*

It is recommended that the Agency establish a hard deadline for review of the TEA and response to the ESCO. The Agency should develop a review plan and set aside focused review time. Overall review of the TEA, and of specific sections, should be assigned to designated individuals.

After Phase 1, Part A is completed and accepted by the Agency, the Agency and/or ESCO determine if the project is viable. The ESCO should also state in the TEA what the cost of the audit is should the client decide not to proceed with construction ("walk-away fee"). Typical costs for investment grade audits are $0.10 – $0.15 per audited square foot.

Phase 1, Part B - Project Development Plan (PDP)

Once the Agency selects measures in the TEA to move forward, the Agency and ESCO then execute Phase 1 Part B - PDP. The purpose of the PDP is to take the measures from the TEA that have been selected for implementation and further develop the measures prior to implementation. The PDP identifies the commencement date and required completion date of the plan. It also covers compensation (fixed fee) to the ESCO, including fees payable upon early termination of the contract. The PDP is the last step of the analysis phase prior to signing the Phase 2 Design and Construction contract.

During the course of the Phase 1, Part B - PDP of the ESPC project, the ESCO will be required to prepare a comprehensive State Energy Efficient Design ("SEED") analysis of the project and provide all Agency documentation and all other services that are required under the Oregon Department of Energy's SEED Program (consistent with the requirements of ORS 276.900 through 276.915 and OAR 330-130-0010 through 330-130-0100) that are applicable to the project.

ESCO Scope of Work

The Scope of Work in the PDP includes:

- Design development documents;
- Final documents specifying equipment selection;
- Agreed upon energy use baseline;
- Methods to adjust the baseline during the post-construction measurement phase;
- Costs for the all phases of the design/build contract;
- Draft start up and commissioning plan;

- ESCO's training responsibilities and associated costs;
- Measurement and verification plan; and
- ESG documentation.

The primary schedules provided by the ESCO in the PDP include:

- Equipment to be installed;
- Calculation of ESG;
- Compensation to the ESCO;
- Energy Use Baseline;
- Savings Calculation Formulae; Methodology to Adjust the Baseline during the post-construction measurement phase;
- Measurement and Verification Plan; and
- Guaranteed Savings Contact Provisions (to be included in the Design and Construction Contract).

Establishing the Energy Use Baseline

The energy use baseline can be calculated in different ways depending on what EEMs are being evaluated. A baseline may be created from historical utility billing data or special purpose metering of existing equipment. Each alternate approach has advantages and disadvantages.

The simplest energy use baseline is to use previous utility bills. Establishing an energy use baseline using billing data is low cost because the metering and data collection are already being performed. The fundamental disadvantage of using billing data to measure savings is that it reflects not just the impact of the energy efficiency equipment, but the impact of all changes, such as weather, changes in occupancy, addition or removal of equipment, and many other variables that affect building energy use. In order to use billing data reliably as a baseline, it must be established that these other factors have small impacts compared to the EEMs. Otherwise, a method to adjust for their effect must be determined.

Averaging energy use over several years helps account for year-to-year variations in the energy use baseline, but does not address long-term trends. For example, if a facility is increasing its hours of use and adding new equipment, a more accurate forecast of future use might show a steady increase. In this case, using a particular year or average of previous years will underestimate the savings. If energy use has been declining (e.g., due to a decline in occupancy levels, hours of operation, or other efficiency improvements), a historical energy use baseline will over-estimate savings.

Billing data reflects all the changes in energy use at a facility, so if many different EEMs are implemented in a comprehensive project, a single measurement evaluates the collective impact, including all interactions between the improvements. If there are significant changes in energy use unrelated to the efficiency improvements, this all-inclusive feature is also a disadvantage.

One method to adjust for the impacts of other factors is to develop a computer model of the facility's energy use. The inputs to this model are adjusted until the predicted energy use agrees closely with the historical use. This "calibration" is intended to ensure that the model is a valid representation of the facility's energy performance. Then, usually once a year, data on weather, schedule, connected loads, and building area are entered into the model in order to re-calculate the energy use baseline based on that year's actual operating and weather conditions. One of the disadvantages of this method is that because of the opportunity (and incentive) for the ESCO to change the model in its favor, the facility staff must become equally knowledgeable about the computer model and its sensitivity to different data inputs. A certain level of computer modeling expertise is required to evaluate the model and may be a role for the Owner's Representative if the agency does not possess the necessary skill in-house. Additionally, annually re-computing the energy use baseline creates a regular opportunity for major disputes to arise.

An alternative approach to overcome these disadvantages is to use end-use or equipment-level metering to establish an energy use baseline. In practice, calculation of energy use baselines based on equipment metering may be more complex and because metering must be specially installed, read, and calibrated for the duration of the contract, it is more expensive than analysis of utility billing data.

Equipment metering has the potential advantage of observing only the change in energy use accomplished by the efficiency improvement, however interactive effects between improvements will not be counted (e.g., lighting improvements that reduce the cooling load or increase the heating load).

The Agency has the responsibility to review and approve or reject the ESCO's proposed baseline method in its review of the PDP. Table 2 compares the methods for establishing baseline energy use.

Table 2
Advantages and Disadvantages of Alternate
Energy Use Baseline Calculation Methods

Method	Advantages	Disadvantages
Utility Billing History	• Lower cost • Data already available • Independent data • Represents effects of all EEMs • Accounts for interactive effects	• Effects of weather, occupancy, other changes may mask savings • Requires development of facility energy models to confirm future savings, which may lead to disputes
Equipment Metering	• Isolates effect of EEM • Very accurate for certain measures (i.e., lighting) • Results are more predictable (i.e., lower risk)	• Higher cost • Data collection and analysis required • Misses interactive effects

Baseline Adjustment Cautions

Adjustments to the energy use baseline typically occur only during the measurement phase of the contract, to account for such pre-approved changes as weather variations, significant changes in occupancy or operating hours, etc. It is not standard practice for an ESCO to propose adjusting the energy baseline to account for perceived code issues, such as stating that if the equipment had been operating to current code levels, more energy would have been used and therefore the baseline should be adjusted to account for it. This method typically increases the energy baseline and results in a false view of savings. The goal is to have real energy savings resulting in real dollar savings. Actual dollar savings will be needed to meet debt obligations. Any measure or operational change proposed by an ESCO that increases energy usage should be defined, quantified, and included as a separate measure to be implemented, rather than as a hypothetical baseline adjustment to a facility's historical energy usage.

Modifying the Energy Use Baseline

The use, equipment, or buildings of a facility may change during the measurement and verification phase of the project in a manner that makes the previous energy use baseline unrepresentative of the facility. As an example, reducing operating hours in a building from 60

to 40 hours a week would reduce energy use significantly. This reduction would not be energy "savings" under the ESPC because the reduction did not result from equipment installed by the ESCO, but from unrelated changes in use. If the utility bills from a previous year were the energy use baseline for measuring savings, the savings measurement would include not only the actual savings but the savings from reduced operating hours as well. This would be considered a significant change and should result in a modification of the baseline.

Because conditions change regularly in most facilities, only certain changes should trigger an energy use baseline modification. Changes in building equipment or operating hours that are likely to have little or no impact on energy use should be ignored as far as the baseline is concerned. A standard should be established in the contract to clearly define what changes will be considered 'significant.' As part of the TEA and PDP, the ESCO develops a Methodology to Adjust the Energy Use Baseline. The methodology is subject to negotiation between the Agency and ESCO before the Design and Construction contract is executed. Any modifications are subject to the methodology agreed to in the ESPC contract. Examples of significant modifications include:

- Changes in occupied square footage;
- Changes in operating hours of the facility;
- Changes in the facility's energy equipment or operating parameters other than the ESCO installed equipment;
- Significant changes in weather between the base year and guarantee year as measured by daily degree-day comparisons;
- Energy equipment, other than ESCO installed equipment, that malfunctions, or is repaired or replaced in a manner that increases or decreases energy consumption;
- Other actions taken by Agency that may reduce or increase energy use; and
- Discovery of an error in the original energy use baseline—in that case the change would be retroactive.

Critical: Be very cautious of any ESCO that proposes baseline adjustment methods that do not use standard baseline adjustment methodologies.

Base Rates and Ceiling Rates

Agencies must also pay attention to the base rate and the ceiling utility rates that the ESCO uses to calculate reimbursement if the energy savings guarantee is not met. The Agency should agree to a base rate no less than their current actual cost of energy. The ceiling rate should be 140% - 150% of the current rate. The base and ceiling rates come into play in the event that the ESG is not met. If the energy savings guarantee is not met, the ESCO writes a

check to the owner for the financial value of the difference. This floor and ceiling rate will determine how much the ESCO writes the check for. For example, as utility rates increase, the cost of the shortfall increases. If the contract does not have a ceiling rate, the ESCO may write a check not worth the real value of the savings. A 150% ceiling means that the ESCO will be obligated to calculate the guarantee using the current rate, but not more than 150% of the initial utility rate. This is important because the guarantee contract may last several years, and utility costs generally increase each year. It is equally important to set up a base rate because if utility rates decrease, a cost shortfall can occur, adversely affecting Agency financial obligations.

ESCOs may want to build in utility cost escalation into the cash flow for the project. Escalation rates are used to assume an increase in utility costs over the time of the project. An aggressive escalation rate may give the owner the impression that they can do more measures because often times the project is structured to be cash flow neutral or positive. When the owner is deciding on how much project they can afford, they will take into account the utility costs savings over the life of the project, often 15 years. It is prudent to ask the ESCO to provide a cash flow summary without escalation along with the cash-flow summary with escalation for comparison. Forecasting energy rates is difficult, and pursuing measures that have a positive financial return based on a forecasted energy rate escalation is not recommended.

Preliminary M&V Plan

The measurement and verification (M&V) of energy savings is the most important metric of an ESPC project. The PDP should include a preliminary M&V plan following the International Performance Measurement and Verification Protocol (IPMVP), explaining how savings from each measure is to be measured and verified (stipulated by contract, utility bill analysis, end-use measurement and calculation, etc.).

The Federal Energy Management Program has developed program guidelines for life cycle cost analysis, an escalation rate calculator and handbook, which can be found at http://energy.gov/eere/femp/building-life-cycle-cost-programs. The use of this guideline is recommended for evaluating costs and benefits of EEMs.

Agency Responsibilities

Generally, the efficiency improvements installed by the ESCO depend on certain actions by the Agency in order to achieve savings. The Agency must make sure that the contract describes its obligations very clearly. This ensures that the Agency understands its commitment and prevents the ESCO from unreasonably claiming that savings were not achieved due to omissions by the Agency.

Agency responsibilities may include operating or maintaining existing equipment in a way that helps the incorporated EEMs achieve savings. For example, if the ESCO proposes energy management controls for an existing air conditioning system, the ESCO may ask the Agency to maintain the system to an agreed standard.

Phase 2 - Design and Construction Contract

If the Agency accepts the Project Development Plan and all associated documents generated under Phase 1, the Agency and ESCO execute the Design and Construction Contract to perform the work identified in the PDP. The Design and Construction phase includes the development of construction documents, project management, construction management and construction services, and providing all material, equipment, tools and labor necessary to complete and commission the project.

ESCO's Services

The ESCO's scope of work or services have been identified in Phase I, Part A - TEA, and Part B - PDP, and are incorporated, by reference, into this contract. Other subsections detail ESCO project management requirements, design requirements (of construction documents, since design development documents were completed in Phase 1), construction administration, construction management, and construction services.

Compensation

The contract establishes the price that will be paid for ESCO services, the timing of payments, and how payments will be calculated. The contract establishes a maximum, not to exceed, total amount payable under the contract. Changes can only be made by approved change orders. The contract establishes a GMP for construction work and sets the ESCO fee as a percentage of the GMP. The guaranteed maximum construction costs are based on the total project, not measure-by-measure basis. The GMP should include all project elements like project and construction, construction administration, permits and bonds, contingency, and the ESCO fee (with fee percentage compared to total cost). In addition, the contract sets firm fixed fees for development of construction documents, systems start-up and commissioning, training of Agency's O&M staff, measurement & verification, and ESG.

Design and Construction compensation is outlined in Table 3, following the sections of the Sample ESPC.

Table 3
Design and Construction Contract Costs

	Contract Cost Components	Sample ESPC - Design and Construction Contract Reference
1	Contract Price = GMP + Professional Services (2 + 6)	Section 9
2	GMP = Cost of Work + ESCO fee + Contingency (3 + 4 +5)	Section 9.1
3	Cost of Work (COW) includes: • Direct Construction Costs (DCC) - the costs to Owner of all divisions of construction, including portable equipment designed or specified in the specifications.* • Project Management, Construction Management, Construction Administration Services (PM, CM, CA are percentage of DCC) • Bonds (percentage of DCC) • Permits, etc.	Section 9.1.2 and Section 11
4	ESCO fee - calculated as a percentage of the COW	Section 9.1.1
5	Contingency - calculated as a percentage of the COW	Section 9.1.3
6	Professional Services components** • Design Fees • Commissioning Fee • Training Fee • M&V Fee • Guarantee Fee	 Section 9.2 Section 9.3 Section 9.4 Section 9.5 Section 9.6

*Sub-contractor costs included in DCC
**Sub-consultant costs should only be included in the professional services component

It is advised that the Agency close out and reconcile projects as measures and work milestones are completed. Invoices should be validated against work performed and substantiated with fee, schedule and project documents. Do not wait until the entire aggregate project is complete to closeout and reconcile costs. For example, an aggregate project that consists of several EEMs will naturally be implemented in multiple phases. The lighting projects may be the first to be implemented and the controls may be the last to be completed and the time between both may be 6 months or more. ESPC includes an open book pricing mechanism, but it can be difficult to track costs with confidence if the Agency and ESCO wait until the end of the project to reconcile project costs. Therefore, it is recommended that you close out projects as they are complete to better track costs and fees.

Phase 3 Measurement and Verification

The measurement and verification (M&V) of energy savings is the most important metric of an ESPC project. As stated by the Efficiency Valuation Organization (EVO) "M&V is the process of using measurement to reliably determine actual savings created within an individual facility by an energy management, energy conservation or energy efficiency project or program. As savings cannot be directly measured, the savings can be determined by comparing measured use before and after implementation of measures, making appropriate adjustments for changes in conditions."

The industry standard for determining M&V practices are found within the International Performance Measurement and Verification Protocol (IPMVP) published by EVO. The IPMVP provides an overview of current best practice techniques available for verifying savings from energy savings measures.

According to EVO "The fundamental principles of good M&V practice are described below, in alphabetical order:

1. **Accurate** - M&V reports should be as accurate as the M&V budget will allow. M&V costs should be small relative to the monetary value of the savings being evaluated. M&V expenditures should also be consistent with the financial implications of over- or under- reporting of a project's performance. Accuracy tradeoffs should be accompanied by increased conservativeness in any estimates and judgements.
2. **Complete** – The reporting of energy savings should consider all effects of a project. M&V activities should use measurements to quantify significant effects, while estimating all others.
3. **Conservative** – Where judgements are made about uncertain quantities, M&V procedures should be designed to under-estimate savings.
4. **Consistent** – The reporting of a project's energy effectiveness should be consistent between:
    - Different types of energy efficiency projects;
    - Different energy management professionals for any one project;
    - Different periods of time for the same project; and
    - Energy efficiency projects and new energy supply projects.
5. **Relevant** – The determination of savings should measure the performance parameters of concern, or least well known, while other less critical or predictable parameters may be estimated.
6. **Transparent** – All M&V activities should be clearly and fully disclosed."

The M&V plan should include the following elements:

- A description of the EEM and its intended result.
- An overview of the intended IPMVP option to be used.
- Measurement methods and equipment to be used.
- Commissioning of newly installed EEMs.
- Documentation of post EEM energy and operating data (Reconciliation Report).
- Savings report.
- Costs of M&V operations and equipment.
- Performance period M&V activities, with frequency and duration.
- Specification as to how the ESCO will reimburse the Agency for the difference between verified savings and the guaranteed level of savings. Further, specify the timing of when the ESCO will make reimbursement to the Agency.

This separate M&V contract should include a provision for a Post-Installation M&V report, which should be delivered to the Agency within 30 days of the end of the Commissioning phase for review and acceptance. This report will be able to forecast whether the installed EEMs will achieve the guaranteed savings or not. The Agency and OR should thoroughly review the report, and comment as appropriate. The ESCO responds to the comments and the report is finalized. Once the post-installation report is approved, the Agency should accept the project, and begin making payments.

During the performance period, periodic M&V reporting should be conducted to verify persistence of savings. The frequency of reporting can vary depending on the needs of the Agency or project. It is recommended that Annual M&V reports be submitted every year for the length of the contract term, and that they be reviewed by an M&V expert to ensure compliance with the contract. If the Agency is interested in reducing costs during later years of the contract, the M&V report can be eliminated. However, the recommended minimum length of M&V is two to three years.

Performance Period M&V reports should include the following elements:

- An executive summary that gives a brief description of the EEMs installed and whether the guaranteed savings were achieved.
- Body of the report should contain:
    - Calculation of the energy savings verified for each measure
    - Brief description of any changes to the facilities identified. If these changes have an impact on the verified savings, and the resultant (calculated) impact on the savings.

- Any other agreed to deliverables that were proposed, such as greenhouse gas reduction metrics or building performance benchmarks.
- All physical measurements that were performed ((e.g., boiler combustion test results, motor runtime logs, etc.) If necessary these can be attached via appendix to the main report, including any metered printout results.
- The guaranteed minimum energy savings (identified in the IGA) and verified actual energy savings should be identified in tabular form for easy reference by the owner and their third party consultant. Furthermore, the energy savings should be:
    - Identified in the native unit of measure for each utility commodity, such as kWh or Therms, for both guaranteed and verified.
    - Translated into utility bill dollar savings; and
    - Denoted in dollars, using the appropriate pre-defined escalation factors affecting performance period savings (e.g., utility and labor escalations) should be factored as required.
- If the report indicates guaranteed savings (aggregate) are not being met, the ESCO should provide proposed remedies to correct the deficiencies. The ESCO should detail and specify whether and by when the physical aspects of the project that led to the loss of savings will be corrected.

Monitoring and Managing an ESPC

The section above*, Organizing a Project Team*, describes the need for a multi-disciplinary approach (involving facilities management and planning, procurement, budget, and legal) during project development and contractor selection. After the contract award, the Agency's designated project manager is primarily responsible for the day-to-day oversight of the ESCO activities.

After contract award, the project proceeds in three phases:

1) Phase 1 Part A - Technical energy audit (TEA) and Part B - Project development plan (PDP),
2) Phase 2 - Design/construction and commissioning, and
3) Phase 3 - Measurement and verification/ESG.

The key to managing the project is to ensure timely and complete communication between the ESCO and Agency project team. The Agency should document all comments and responses, and require the ESCO to track changes and provide revised documentation for review and approval. Integrating facility staff and managers throughout the project process is

also critical. Meetings held at major project milestones establish a pattern of communication and mutually agreed benchmarks that can then be used to monitor and control the progress of the project.

Table 4 summarizes major milestones and topics that need to be discussed at each one. Once the contract is awarded, it's easy for the staff to turn their attention back to their regular responsibilities and for the ESCO to focus on the current task and forget to keep the staff informed. A schedule of regular project meetings helps prevent surprises and keeps the contractor on track.

Table 4
Suggested Milestone Meetings

Phase 1, Energy Savings Performance Contact
Initial Project Meeting/Kick-Off
• Discuss measures Agency wants evaluated • Discuss security, safety, site check-in and check-out • Review energy audit requirements
Technical Energy Audit, Phase 1, Part A
• Bi-weekly meetings to discuss existing conditions, energy measures, potential problems, etc. • Present energy audit drafts • Determine which energy measures to pursue • Present final TEA
Project Development Plan, Phase 1, Part B
• Bi-weekly meetings to discuss progress, potential problems, etc. • Present plans and design document drafts • Discuss modifications to plans and design drafts • Present final Project Development Plan

Phase 2, Design and Construction
Initial Project Meeting
• Review contract requirements • Present schedule for the performance of ESCO services and interim construction documents
Construction Documents and Measure Installation

• Selection and final scope of work for subcontractors
• Weekly meetings to:
  ○ Discuss project status
  ○ Present interim construction documents

Commissioning
• In-progress testing/commissioning results • Notice of Completion • Plan for acceptance testing of work • Plan for facility personnel training • Plan for installation documentation • Schedule for first-year measurement activities

Phase 3, Annual Monitoring of Savings & Standards of Comfort
• Annual monitoring of savings and standards of comfort • Calculation of energy savings and baseline reconciliation modifications • Schedule for next year's measurement activities • Schedule for preventative maintenance and training • Outstanding issues

Phase 1, Part A Technical Energy Audit and Part B Project Development Plan

Immediately after the execution of the first two contract documents (ESPC and TEA, Part A) a project meeting should be held to plan the ESCO's first major task—the TEA. This meeting should include a facility presentation on measures the agency would like to see evaluated and a description of procedures such as security, safety, site check-in and check-out, parking, identification, access to occupied spaces, etc. The ESCO may also require access to equipment rooms and secure spaces from agency facilities staff in order to familiarize themselves with the project. Access requirements should be discussed well beforehand to ensure that agency staff understand the schedule and time commitment involved. The ESCO should describe its plan

for the energy audit, particularly on-site activities and intermediate submittals for review. The parties should review the audit contract as a reminder of the contract requirements for contents of the TEA. Notes from this meeting will document mutually accepted procedures and a plan to complete the energy audit within an agreed upon timeframe as provided in the audit contract. The Agency project manager should make sure that such meetings are not used by the ESCO to renegotiate deadlines or any other requirements of the contract.

Phase 1, Part A, Technical Energy Audit

During the energy audit phase, project meetings between the ESCO's project manager and the Agency's project manager (and other facility representatives as appropriate) should occur at least once a month. In many cases, meetings every other week will be preferable. The purpose of the meetings is for regular updates to discuss existing conditions and EEMs the ESCO is considering. The project manager can use these meetings to ensure the ESCO is basing the analysis on realistic assumptions and is evaluating the improvements that are important to the Agency.

Phase 1, Part B, Project Development Plan

If the Agency accepts the TEA, the Agency and ESCO then execute Phase 1 Part B - PDP. The purpose of the PDP is to take the measures from the TEA that have been selected for implementation and further develop the projects prior to implementation. The PDP identifies the commencement date and required completion date of the plan. It also covers compensation (fixed fee) to the ESCO, including fees payable upon early termination of the contract.

Completion of design development documents is part of the Project Development Plan. In addition, this phase includes specification of equipment to be installed, calculation of the ESG, compensation to the ESCO, the energy use baseline, and methodologies to adjust the energy use baseline during the measurement phase. It will also include a draft start up and commissioning plan and the ESCO's training responsibilities and all associated costs. In addition, the ESCO develops the measurement and verification[3] and ESG documents that go into effect after project completion and Agency acceptance.

The ESCO, working with the Agency's project manager should also maintain contact with the Agency's utility representative to maximize utility incentives. Many of these incentives need to be approved prior to construction and thus proactive communication will allow for maximizing any possible incentive funds. Further, the ESCO should involve the utility company to the

extent necessary to verify energy improvements are consistent with the utility's conservation program requirements - inclusive of pre-construction (baseline) verification.

The PDP is the last step of the analysis phase prior to signing the design and construction contract. This is a critical juncture in the process and regular and clear communications can make or break a project. Meetings should be held every other week and an agenda should be prepared to allow both parties to include their most important issues.

Phase 2, Design and Construction

The design and construction phase of the project requires the most coordination and interaction between the ESCO and Agency. This phase begins with Agency approval and acceptance of the Phase 1, Part B Project Development Plan. The model contract requires the ESCO to develop, for the Agency's approval, a schedule for the performance of the ESCO's services and submission of in-progress construction documents as needed.

Engineering Design

As part of the ESPC approach, the ESCO serves as both the professional engineer and the general contractor. Overlapping measure development and preliminary design as well as final design with construction minimizes the project risk for the client and reduces the delivery schedule. Since the Phase 1 TEA and PDP have defined the scope of work in enough detail for the ESCO to secure 'not to exceed' pricing from contractors, schematic design typically begins the final phase of measure and project development. This is also necessary in order to obtain relative construction pricing assurance. The Agency should review the construction documents at the 30%, 60% and 90% stages and provide written review comments to the ESCO. Upon the completion of the 100% CDs (drawings and specifications), the ESCO should provide a printed copy of the documents to the Agency.

During the final design phase, the Agency and the ESCO work together to determine what methods and materials will maximize the owner's value without compromising performance metrics. The process allows the Agency additional opportunity, through design review, to make adjustments without having to rebid. Pricing will be maintained if the prescribed changes are minimal. Once designs are approved, the ESCO finalizes equipment/system selection and furnishes equipment submittals to the Agency. The remaining design activities necessary to obtain building permits will immediately commence once the Phase 2 – Construction contract has been executed. These activities, along with the less technically challenging measure opportunities, initiate the formal construction phase of the project activity.

Construction

Prior to installation of any equipment, the ESCO should deliver any required submittals to the Agency for approval. The submittals should match the items included as basis for the design. This prevents the accidental purchase of incorrect or less-efficient equipment that may not achieve the guaranteed savings. Generally the ESCO and its subcontractors have control over the selection of equipment and are responsible for its proper installation, commissioning, and performance. Also, the ESCO has responsibility to demonstrate that the new improvements meet expected performance levels including specified equipment capacity, standards of service, and efficiency. The Agency should clarify who will be responsible for the initial and long term performance, how it will be verified, and what will be done if performance does not meet expectations.

Major construction parameters (i.e., working hours, timelines, and required agency support, etc.) should be well-defined and documented prior to actual construction. The transition from final design into implementation should be seamless. Some measures, based on the level of complexity, can be implemented in a continuous fashion. Though continuous, the implementation of the EEMs will still be a multi-phase process. Measures requiring little or no additional design, such as lighting and motor retrofits, can be initiated and completed prior to or concurrently with measures having extensive design elements, that may have longer lead times due to product procurement and/or staging cycles, such as boiler or window replacements.

Management of the construction phase of the performance contract is essentially the same as the management of a large design/build retrofit or repair and maintenance project. Diligent pre-planning will result in fewer time delays and allow the Agency to realize energy savings more quickly. During this phase, weekly (and sometimes daily) project meetings should be held for the ESCO to make status reports. Furthermore, the ESCO should issue meeting minutes within three business days of the meeting. Meeting minutes should include all identified issues of concern, identification of those responsible for solving these issues, and the time period expected for resolution. Unresolved items should remain open from meeting to meeting until closed or resolved. Proper communication within and outside of the Agency is also necessary to help building occupants and the public understand any potential impacts. The Agency project manager should work closely with their facilities and administration staff to ensure occupant issues or questions around the project can be directed to a single Point of Contact.

Training Requirements

It is the ESCO's responsibility to describe the amount and type of training for each EEM that will be provided to the Agency. The ESCO's approach should depend on the level of O&M responsibility to be assumed by the Agency. Though the ESCO is responsible for assuring EEM performance, the Agency will typically agree to some O&M responsibilities. Therefore, the Agency should be trained in a manner sufficient to perform any agreed upon O&M activities. Specified training should be completed prior to the Agency's final acceptance of equipment installation. The ESCO and Agency should also agree on the extent to which the ESCO and its subcontractors must provide ongoing training related to any updated or altered equipment, including software.

Commissioning

Project commissioning is critical to the success of ESPCs. Commissioning is completed by a Commissioning Agent and begins in Phase 2 with documentation of the design intent and continues through construction, training of facility staff, and Agency acceptance.

Meetings on commissioning issues can be held in conjunction with regularly scheduled construction meetings. It's important to discuss any equipment, system, or design problems during these meetings. For example, it's not uncommon for the commissioning agent to discover code violations, installation of incorrect equipment, or improper operation/scheduling of equipment during construction. It is important to communicate those items to the Agency and ensure corrections are made. Documentation of the issues and their resolution are typically completed in a Commissioning Log and Report, of which the Agency should always have an updated copy.

Commissioning extends through Phase 3 - M&V and the warranty period with documentation of the performance of each piece of equipment and system sequence of operation. Typically the ESCO will provide a comprehensive equipment and labor warranty for one year from the date of installation. But, as some larger projects may take up to two years to be completed, it is possible that some warranties could expire. To address this, consider extending the ESCO warranty period to start from the date of substantial project completion and acceptance. Specific equipment manufacturers will also have warranties that vary significantly based on the type of equipment selected. Agencies need to carefully evaluate manufacturer warranties and determine if there is any value in purchasing extended warranties.

Phase 3 - Measurement and Verification/Energy Savings Guarantee

In the Phase 1, Part B - Project Development Plan, the contractor documents the annual method of determining energy savings and compliance with standards of comfort that will

occur throughout the contract term. This method should be referred to and checked against the schedule of first year measurement activities that the contractor submits for approval at the commissioning meeting. This schedule should include an annual, joint inspection with the Agency to verify that all contractor-installed equipment is being operated and maintained as designed. The annual meeting should review the calculation of energy savings for the previous year, including any material changes or modifications of the energy use baseline. At each annual meeting the schedule of measurement activities for the following year should be reviewed and approved.

At the end of each year during the performance period, the ESCO should submit an Annual Report to demonstrate that the savings have occurred. The Annual Reports should include:

- Results/documentation of performance measurements and inspections
- Realized savings for the year (energy, energy costs, O&M costs, other)
- Comparison of actual savings to the guaranteed amounts and explanation of variations, if any.
- Details of all analysis and savings calculations, including commodity rates used and any baseline adjustments performed
- Summary of operations and maintenance activities conducted
- Details of any performance or O&M issues that require attention

Note: The energy savings guarantee is always based on energy units saved, not dollars saved since the ESCO has no control over utility costs. Costs are associated with these energy savings so investment decisions can be made up front and shortfall payments can be assessed in the event that the guarantee is not met.

These annual meetings are not a substitute for ongoing monitoring of maintenance activities or standards of comfort or regular auditing of energy-savings estimates included in contractor-submitted invoices. They supplement these ongoing activities and provide an opportunity for a comprehensive review of the performance of the project on a facility-wide basis. Because they are not in response to an immediate problem, the meetings make it easier to observe trends and long-term facility changes. They also serve as an annual opportunity for facility staff to ask questions and offer suggestions to the contractor regarding how to optimize system performance.

One of the benefits of energy savings performance contracting is that the ESCO has a strong financial interest in ensuring that maintenance is properly performed. Poor maintenance can reduce savings or cause standards of comfort to deteriorate below contract requirements. Both of these results are potentially costly to the ESCO. A schedule for regular maintenance

activities should be established and monitored and comfort complaints should be used as a warning that closer attention may be needed.

Glossary of Terms and Abbreviations

"Commissioning" is an intensive quality assurance process that begins during design and continues through construction, occupancy, and operations. Commissioning ensures that a facility and its systems are planned, designed, installed, tested, operated and maintained to meet the Owner's requirements. Commissioning includes verification of system installation and operating parameters, training of operations and maintenance staff, providing equipment manuals and documentation, and all warranty information.

"Energy Efficiency Measure (EEM)" is a capital or permanent improvement in a facility, designed to significantly reduce energy cost and the total energy use at the facility. These are also sometimes called Energy Conservation Measures (ECM) or Facility Improvement Measures (FIM).

"Energy Savings Guarantee (ESG)" is a guarantee provided by the ESCO that the energy use reduction and corresponding savings produced by the project will be sufficient to cover the cost of project financing for the life of the project. The guarantee also details the financial remedies available in the event the guaranteed savings and performance are not achieved.

"Energy Service Company (ESCO)" means a company that identifies energy improvements in a facility, in some cases provides capital required to install improvements, offers turn-key design and installation services, and guarantees energy savings.

"Energy Savings Performance Contract (ESPC)" is a public contract between a state agency and a qualified ESCO for the identification, evaluation, recommendation, design and construction of energy efficiency measures, including a design-build contract, which guarantees energy savings or performance.

"Investment Grade Audit (IGA)" is a detailed building survey that identifies all cost-effective energy efficiency measures, including potential capital intensive improvements along with proposed changes to operation and maintenance procedure. The audit report provides detailed project cost and savings calculations with a high level of confidence sufficient for major capital investment decisions.

"Guaranteed Maximum Price (GMP or GMAX)" contract means a cost-plus agreement with a cap on the owner's total liability for the costs of construction of the project, also considered the "not to exceed" price by the Owner. The owner is obligated to pay the contractor for the actual costs of construction up to a certain sum.

"ODOE" refers to the Oregon Department of Energy

"OAR" refers to Oregon Administrative Rules

"ORS" refers to Oregon Revised Statutes

"Owner or Agency" Refers to any and all staff employed and authorized by or representing the agency in charge of the facility (facility manager or administrator, operations and maintenance staff, business manager, etc).

"Phase 1, Part A Technical Energy Audit (TEA)" means a comprehensive investment grade energy audit that seeks to identify all cost-effective investment opportunities through a combination of engineering analysis of energy-using systems and economic analysis of possible energy saving measures.

"Phase 1, Part B Project Development Plan (PDP)" means the last step of the analysis phase prior to designing the construction or design-build contract. The purpose of the PDP is to take the energy measures from the TEA that have been selected for implementation and further develop the projects prior to implementation.

"Phase 2 Construction" means furnishing, installing and commissioning energy efficiency improvements.

"Phase 3 Measurement & Verification (M&V)" means the examination of installed EEMs using the International Performance Measurement and Verification Protocol ("IPMVP"), or any other comparable protocol or process, to monitor and verify the operation of and savings achieved by energy-using systems post-installation.

"Project Manager" The person with primary responsibility to oversee the work of the ESCO and act as the liaison between the ESCO and the Owner.

"Request for Proposal (RFP)" means a written document describing the Agency's circumstances and the type of service(s) desired; setting forth all significant evaluation factors and their relative importance and, if appropriate, price; and soliciting competitive written proposals.