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ENERGY SAVINGS PERFORMANCE CONTRACTS: *Rewards & Risks*

Facility owners are paying increased attention to energy usage, operation and maintenance (O&M) costs, infrastructure management, and the overall financial performance of their facilities.

They have called upon the construction industry to assist in these efforts, and some segments of the industry have flourished around owners' demands for energy efficiency and cost reduction.

One of the more popular and successful project delivery methods is Energy Savings Performance Contracting (ESPC).

ESPCs offer distinct benefits to both facility owners and ESPC contractors. From the owner's perspective, ESPCs provide cost recovery through utility and O&M savings, typically guaranteed by the contractor.

From the contractor's viewpoint, ESPCs offer an additional source of revenue, projects, and recognition. ESPCs will compensate contractors for their traditional services, such as construction and installation, as well as their analysis and advice regarding savings, the guaranty, and ongoing O&M services.

Contractors may also view ESPCs as a vehicle to diversify their portfolio of work and a potential selling point to convince reluctant owners to commence long-overdue renovation projects. Moreover, ESPC projects offer contractors a way to distinguish themselves from other contractors that do not offer the benefits provided by ESPCs.

Although ESPCs offer significant benefits, they should be approached with caution, as they usually involve detailed investigation, complex engineering analysis, and expensive equipment; most projects also require work in occupied facilities. In addition, ESPCs carry a level of financial risk, and require ongoing O&M and measurement and verification (M&V) activities, both of which add complexity and cost to the project.

About ESPCs

ESPCs are performance contracts in which energy and operational project savings provide sufficient funding to pay for the project over the duration of the contract. As the primary characteristic of an ESPC, the contractor guarantees an agreed-upon level of savings that will equal or exceed the expected project costs or payments on a construction loan.

ESPC projects combine an array of energy-efficiency and performance-enhancing measures with a guaranty of savings resulting from such measures. They involve services related to project identification, energy audits and facility assessments, and design and construction. In addition, they typically encompass ongoing O&M and M&V services. Financing options are also offered by or through larger or more experienced contractors.

Parties to an ESPC include a building owner and a contractor, commonly known in the industry as an energy service company (ESCO). In addition to the contracting parties, ESPC projects can involve subcontractors and equipment manufacturers, third-party M&V contractors, utility representatives, and technical advisors to the owner and contractor that include engineering experts, accountants, and legal counsel.

ESPC Phases

ESPCs usually occur in three phases: 1) the audit phase, 2) the construction or execution phase, and 3) the guaranty or performance phase.

Audit Phase

In the audit phase, facilities are audited to assess energy-use patterns, identify potential energy-efficiency and performance-enhancing measures, and evaluate the financial viability of the project. If the audit concludes that sufficient savings are attainable and the parties agree to important contract terms, then they will execute an ESPC for implementation.

Construction Phase

In the construction phase, the contractor procures and implements the energy-efficiency and performance-enhancing measures (e.g., installation of energy-efficient chillers and modern lighting fixtures).

Performance Phase

Finally, in the performance phase, which may span many years, actual savings are measured and verified through the M&V process to determine whether the guaranteed level of savings has been achieved. In this phase, the contractor ordinarily provides O&M and M&V services.

Savings, Measures & Project Funding

At the core of ESPC is the concept of verified savings. The ultimate goal of ESPC projects is to implement energy-savings measures to achieve a level of utility savings that will, at a minimum, exceed project costs (i.e., audit and design fees, construction costs, contractor's fee, costs of such continuing services as O&M and M&V, and, in some cases, financing costs).

Savings may arise from many sources, including:

- Electric and gas usage and demand savings
- O&M cost reductions
- Future capital cost avoidance
- Enhanced revenue generation (e.g., through more productive operations, more accurate measurement instruments, or onsite energy generation)

Measures to achieve savings vary widely, but may include upgrades to lighting fixtures, windows, and doors; modifications to lighting and HVAC systems to incorporate natural light or geothermal heating and cooling; and installation of new energy-efficient equipment and combined heat and power systems.

The top exhibit on page 43 illustrates the continuing benefits from ESPC projects. Before an ESPC project, a facility owner will incur standard costs for utilities and other operational charges. The second bar illustrates that in the typical ESPC project, savings will fund project costs, resulting in no additional cost to the owner over the life of the contract. As shown in the third bar, utility and operational savings should continue after the contractual guaranty period ends. Thus, in a successful project, owners should realize benefits long after project completion.

Calculation of Savings, Baseline & M&V

Calculation of savings is extremely important because it determines whether the contractor's efforts have achieved the guaranteed savings. Savings are calculated by subtracting pre-project utility usage (referred to as the baseline) or other operating expenditure from post-project use or expenditure.

$$\text{Savings} = \text{Cost}_{\text{pre-project(baseline)}} - \text{Cost}_{\text{post-installation}}$$

In lieu of cost figures, some ESPCs compute savings by units of energy (e.g., kilowatt hours of electricity or therms[1] of natural gas). In these projects, verification is based on the quantity of energy savings. Any shortfall in savings is converted into dollars to determine the contractor's liability under the guaranty.

A significant characteristic of performance contracting is the calculation and adjustment of the pre-project baseline. The baseline represents the level of energy and operational cost that would have been incurred in the absence of the ESPC project. Because the baseline is used as a reference point to calculate savings, the parties must carefully consider and address all engineering issues and assumptions when establishing the baseline.

Once a baseline is established, the parties can then assess the project's performance, typically through the use of an agreed-upon M&V plan. The M&V plan is critical because it determines whether the contractor has achieved the guaranteed savings. To streamline this effort, M&V plans usually incorporate accepted industry standards or other established engineering protocols, such as the widely used International Performance Measurement and Verification Protocol.[2]

The bottom exhibit at right demonstrates the concept of savings assessment. As the contract moves through time, savings are compared against the baseline. Where energy usage is less than the baseline, the project has achieved a savings.

In the majority of cases, savings in energy and O&M costs are sufficient to offset project costs or loan payments for financed projects. In a deficit situation, however, usage is greater than the amount necessary to achieve the required savings, and the contractor is contractually obligated to pay the difference in cost or a dollar value of the deficiency.

The Rewards of ESPCs

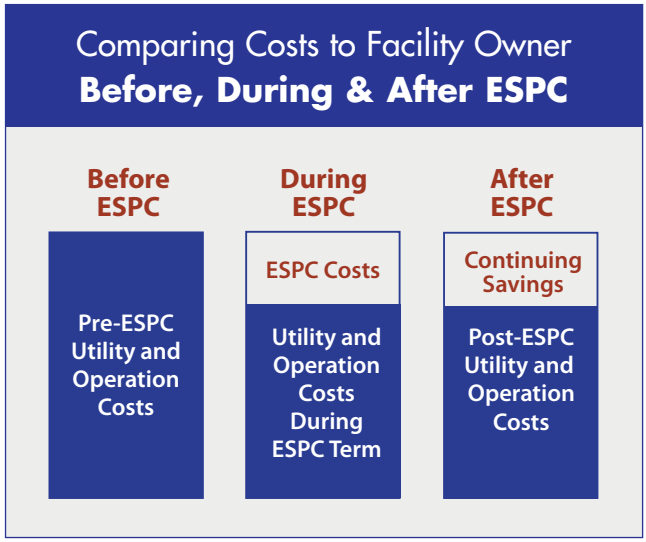
ESPCs offer substantial benefits to owners as well as contractors. Benefits to owners normally include:

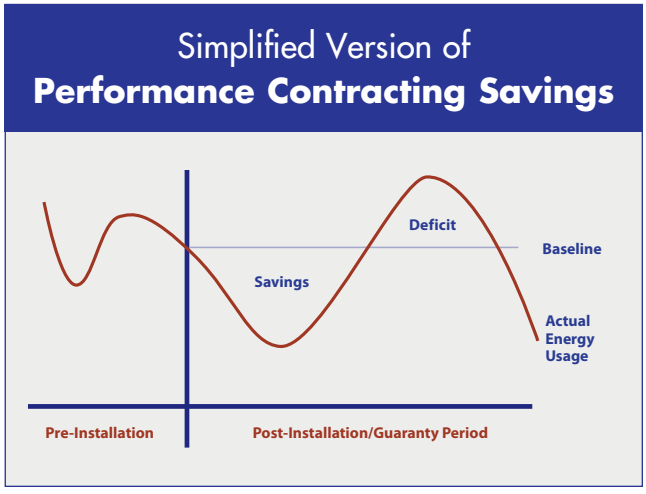
- Reduction in utility usage and relative cost
- Financing of construction costs through savings
- Combined construction and design services, similar to a design-build contract
- Upgraded and modernized facility systems and infrastructure
- Environmental responsibility

To the contractor's benefit, many owners have familiarity with ESPCs and may be more likely to execute a project when they realize that construction costs could be funded by future savings. Many states have enacted statutes to authorize public owners to execute ESPCs.[3]

Owners who have held back on necessary renovations, perhaps due to financial strains over the past several years, may now decide to proceed with their long-overdue projects for ESPC-financed projects. Many ESPCs involve renovations and retrofits, and are an ideal pitch to owners seeking low net cost project delivery alternatives.

For instance, as a result of their diminished tax base, many public owners have avoided or delayed much-needed infrastructure projects and renovations. Contractors experienced with ESPCs can gain a marketing edge when these public owners unload the backlog of projects.





Contractors looking for new markets may find potential in ESPC-based projects. Those contractors that lack the experience or expertise needed for ESPCs may find opportunities in teaming up with larger, more experienced ESCOs or other entities. Teaming up is especially important for specialized subcontractors and suppliers.

The Risks of ESPCs

In spite of their many benefits, ESPCs pose real risks that should be considered long before execution. These risks depend on the presence of many factors, including:

- The size, complexity, and duration of the project
- The magnitude of investment and required capital
- Adequacy and accuracy of facility and utility data
- Proper performance of installed equipment and implemented measures
- Owner's continued and consistent use of facilities and operations
- Reliable and accurate measurement and verification of savings
- Contract terms and the parties' understanding of their contractual rights and obligations
- Relationship and good faith among the owner, contractor, subcontractors, equipment manufacturers, consultants, and other project participants
- Possibility of traditional construction claims and defaults

Complexity & Specialized Expertise

ESPCs are more complex than traditional construction contracts due to their long-term duration, the sophistication of energy systems, and the likelihood of changes in or to the facility that may affect project performance.

The M&V process illustrates one aspect of ESPC complexity. It is a specialized and detailed field of engineering that is essential to ensuring that the project achieves guaranteed savings. M&V is complex because it attempts to measure energy conservation and cost reductions – neither of which can be directly measured. Instead, they must be ascertained by comparing actual performance to a complex yet hypothetical projection: the baseline.

In addition, because facilities and their occupants are not static objects, the M&V process must account for modifications to facilities and occupants' usage – both expected and unexpected. Accordingly, a properly designed M&V plan must be reliable, detailed, comprehensive, and, to some extent, flexible.

Guaranty Risks

Perhaps the most obvious risk relates to the possibility of a shortfall in savings, which would invoke the contractor's liability under the guaranty. Savings shortfalls can place the contractor in a difficult situation and will likely impact its relationship with the facility owner. In fact, several lawsuits

ESPC **Project Example**

A facility owner enters into an ESPC that includes lighting upgrades, hot and chilled water system enhancements, boiler replacements, new building controls, and a service contract to maintain and monitor the project retrofits.

The project has a capital cost of $8.8 million and also includes a $100,000-per-year payment to the contractor for a service agreement and annual M&V services.

The project is financed using a 15-year loan requiring annual repayment of $840,000, at an interest rate of 5% per year.

The facility is currently spending more than $4 million in utility and O&M costs. The ESPC guarantees a savings of $900,000 per year, or approximately 22.5% per year, for 15 years. Maintenance savings and energy costs are contractually stipulated to increase at 3% per year.

As shown in the top exhibit on the following page, the project is expected to produce a decrease in annual energy and O&M costs of more than $900,000 starting in year zero, the beginning of the performance period.

Each year, the realized savings are used to pay the principal and interest on the construction loan. Based on project details and assumptions, the parties can calculate the anticipated annual savings and project-related costs to the owner (loan repayment), along with net savings, as illustrated in the ESPC Cash Flow example on the following page.

In this particular example, net cash flow becomes positive in year three, though many ESPCs require positive cash flow each year. Additional benefits include infrastructure improvements, better system operations, and occupant comfort, together with a reduced environmental footprint.

have resulted from the failure, or alleged failure, to fulfill guaranty obligations.

The disputes that have reached litigation typically resulted from miscommunication or misunderstanding of utility savings calculations, or the ESPC's ambiguity or silence on the subject. Disputes often arise over the proper method to calculate savings.

For instance, if an adequate M&V plan has not been developed and agreed to, then one party might calculate savings based on actual usage (e.g., based on utility invoices), while the other party might calculate them based on a reasonable engineering estimate.

In other shortfall disputes, contractors argued that no guaranty existed in the first place, or that the guaranty had been waived or relinquished by the owner. For example, in response to an owner's invocation of the guaranty, a contractor countered that even though utility savings were stated in its proposal, they were only estimates.

Therefore, the failure to achieve such savings was not a breach of contract. The court ultimately ruled that the contract was ambiguous and allowed the case to proceed so that a jury could make the determination. Unfortunately, the dispute could have been avoided by clear contract language.

Guaranty risk is exacerbated because a savings shortfall can result from many causes, not all of which are the contractor's fault. For example, changes to a facility unrelated to the ESPC can markedly affect energy usage and O&M costs.

In fact, savings achieved by the project can be offset or "masked" by load growth due to such factors as building expansions, changes in facility use, increase in occupancy, addition of energy-using equipment, and adverse weather. To mitigate against such problems, the parties should carefully prepare and review the M&V procedure.

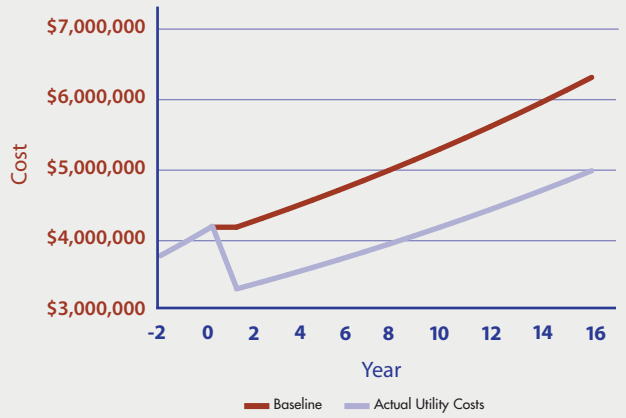
Finally, even before these disputes reach litigation, owners might withhold payment based on savings shortfalls. In one case, an owner withheld payment arguing that the contractor's failure to achieve the guaranteed savings relieved the owner from the obligation to make payment. Obviously, such disputes can quickly become contentious – and costly.

Traditional Construction Claims Risk

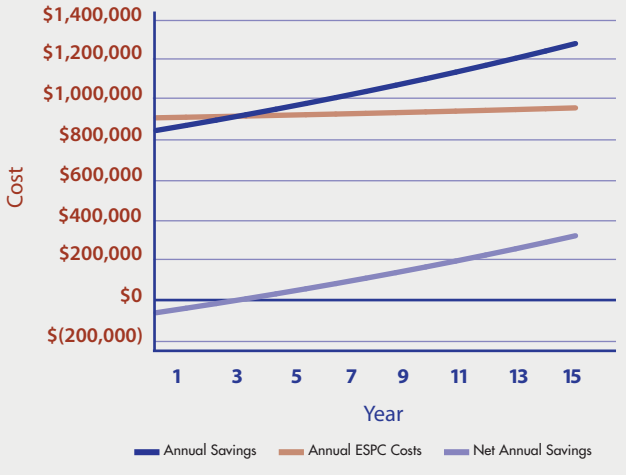
While ESPCs involve unique risks uncommon to normal construction contracts, they nonetheless pose many of the same construction risks. Traditional risks inherent in ESPCs include:

- Claims for delay, deficient installation, and defective equipment
- Changed conditions
- Warranty claims
- Risks arising from ongoing maintenance and monitoring obligations

Baseline & Post-Implementation
Costs to Facility Owner



Example of
ESPC Cash Flow



Some of these traditional risks are intensified in ESPC projects, especially when they involve occupied facilities.

A common type of dispute involving ESPCs arises from defective equipment and installation. Several lawsuits involve allegations of equipment failure or defective installation. Because energy-efficient equipment can be expensive, these disputes can be costly.

In addition, ESPCs that require continuing maintenance and warranty services can impose an additional source of risk on contractors arising from defective equipment and installation. Further, problems with equipment and installation may negatively impact the ability to achieve guaranteed savings.

The concept of changed conditions has an added component in ESPC projects. Traditional changed-conditions claims arise when a contractor encounters conditions during construction that were not represented, or not adequately represented, on the drawings or other information provided by an owner. In the context of ESPC projects, changed conditions may also include changes in the owner's operation of facilities that impact utility usage or O&M costs.

Thus, an unexpected increase in energy usage caused by changing the nature of a facility (e.g., from a warehouse to an office building) would likely cause a substantial change in the energy usage, and potentially a substantial shortfall in savings.

Expectation Risk

Expectation risk is another type of risk that arises when a party does not adequately understand the nature of ESPC projects. Some owners may expect savings to translate into an equal amount of cash in hand.

Even though ESPC projects reduce utility usage, the price of utilities (i.e., rates) may nevertheless increase, resulting in perceived lower savings. Contractors need to explain to owners that they do not control utility prices and that if not for the ESPC project, the owner would have paid even more in total utility costs.

In addition, contractors should explain that other factors can impact savings (e.g., changes in facility operation and adverse weather). Of course, a solid ESPC will contractually address these other factors.

Conclusion

ESPCs can offer substantial benefits to contractors and their customers. Owners are increasingly interested in their facilities' operational costs and especially their utility costs. Contractors that understand the ESPC project delivery method will gain an advantage over others in marketing to these owners. ■

Endnotes:

1. Therm is a common unit of natural gas. One therm is equal to 100,000 British thermal units or approximately 100 cubic feet of natural gas.
2. International Performance Measurement and Verification Protocol: Concepts and Options for Determining Energy and Water Savings, Volume 1. Efficiency Valuation Organization, September 2010. *www.evo-world.org*.
3. A snapshot of state laws on ESPC legislation can be found at *www.ornl.gov/info/esco/legislation/newesco.shtml*.

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