Engineered Savings Programs (ESP)

An Alternative to Performance Contracting

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ABSTRACT

Performance contracting (PC) programs are aimed at funding infrastructure improvements, such as lighting and HVAC upgrades, from energy savings. These programs are typically provided by original equipment manufacturers (OEM) and unregulated utility-based energy services companies (ESCOs). Unfortunately, they have not been accepted widely in the private sector. Consulting engineers often believe that PC programs fail to represent the best interests of the customer. This is because PC programs cost substantially more than traditional energy projects designed by professional consulting engineering firms and installed by construction management companies.

School administrators, facility engineers and maintenance personnel throughout all markets, should be interested in the reasons behind the growing difficulties in PC programs in the private sector and the views of consulting engineers.

Consulting engineers are usually skeptical of PC programs. The PC approach rings true of "If it sounds too good to be true, it probably is." End users increasingly distrust PC arrangements because PC companies and ESCOs also sell equipment or commodities used in PC programs. To their credit, PC companies and ESCOs have tactfully used PCs as a vehicle to do just that—sell equipment or commodities.

PC companies have spent a lot of money to convince building owners to sign a performance contract knowing their marketing effort

would eventually result in a lucrative project. Both PC companies and engineering firms recognize the financial potential and the explosive growth of the energy services marketplace.

However, PC companies have implemented more performance contracts than engineering companies because engineering firms sell their professional services *without* reaping the substantial margins on equipment specified for the project. Engineers haven't been able to produce the profit margins that PC companies have, and thus they can't pursue the massive marketing efforts in the energy related industry that PC companies and ESCOs can and do.

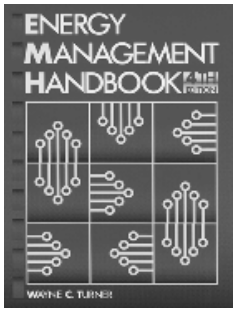
To corroborate this point, many PC companies and ESCOs outsource the engineering evaluation and design of their project. The engineering firm is paid for their professional services as a subcontractor yet the PC company or ESCO still makes margins on the equipment or commodities associated with the project.

Are all PC programs failures or marginally successful? No. Most PC or ESCOs achieve the savings/benefits they promise. Most PC programs guarantee the savings as a requirement from the building owner or as an inducement from the PC company or ESCO.

The quarrel that most consulting engineers and the private sector have with the PC or ESCO based programs is that they don't go far enough to identify and evaluate every opportunity to reduce utility consumption in facilities. This complaint also applies to value-added capital intensive opportunities or deferred maintenance projects that can and should be parlayed into a total energy efficiency project.

Typically, PC companies and ESCOs only focus on the projects that have the best economic parameters and, in turn, reap the highest margins. These projects usually include the "cream of the crop" projects such as lighting upgrades, replacement of HVAC equipment and the installation of HVAC controls (i.e., OEM equipment), but avoid the projects that produce smaller returns.

In addition, PC companies and ESCOs are not normally required to take bids for the products and equipment installed in their projects. This practice would defeat the purpose of the PC or ESCO's marketing strategy, which is to sell their own equipment or commodities. From the viewpoint of the consulting engineer, the PC approach conflicts with the best interest of the customer because decisions are often based on which projects reap the greatest margins and largest savings rather than which equipment or strategy best fits the application.



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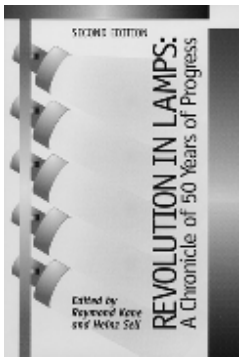

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PC programs usually specify one equipment or commodities supplier. The justification is that having just one type of equipment installed reduces the cost and complexity of maintenance. The troubling aspect of this methodology is that the primary goal for the PC company is to sell their flavor of equipment regardless of whether the equipment is the best product for the application. Unfortunately, that same strategy handicaps the customer when replacement or additional equipment is required. You can't put your needs out for bids when there is only one supplier who can meet them. That fact completely outweighs any perceived benefits/efficiencies that might be achieved in maintenance.

The PC/ESCO strategy reveals its inadequacies very early in the process by not evaluating all energy consuming components during the preliminary engineering study. The PC/ESCO effort usually evaluates only those utility consuming components that can be replaced from its own inventory or those equipment providers that they have strategic relationships with. The PC/ESCO company's interest in selling its own equipment distorts and compromises the basic PC premise of "giving the customer the best return on their investment" and offering the customer a means of renovating and upgrading their facility's mechanical, electrical, plumbing, control and IAQ systems through a unique method of performance financing. Common examples of a PC's shortfalls are:

- New chillers are installed while old pumps are left in place.
- Utility consuming components and cost centers of a facility are not considered, such as water, sewer, maintenance and operations.
- Very critical energy consuming components such as motors are completely overlooked or not considered because of their lower economic return (as compared to a lighting upgrade, for example).
- Standard equipment is installed without evaluating the benefits and economics of more efficient (and maybe more expensive) equipment.

Langton Energy Consultants has introduced an alternative to the performance contracting strategy—the Engineered Savings Program (ESP). Both the PC and ESP approaches use similar methodology and mechanics, but with different objectives. Benefits of the ESP include:

- The ESP emphasizes that all utility consuming components are evaluated.
- Indoor Air Quality (IAQ) issues, deferred maintenance and non-utility consuming projects are also evaluated to determine the maximum cost savings and acceptable comfort and air quality levels.
- All project costs are divulged to the customer before the contract is signed, including engineering fees, equipment costs and the like.
- Procurement and contracting methodology is similar to conventional capital projects.

A hypothetical school will be used to demonstrate the subtle differences between PC/ESCO programs and an ESP.

- Our sample school is a medium sized K-12 district on a singular campus.
- There will be no charge for the preliminary engineering study.
- The PC/ESCO and ESP will conduct equally comprehensive studies. (This level of evaluation is not typical for a PC/ESCO company but to simplify the evaluation we will normalize the front end of the process.)
- We will start out by setting the cost of the engineering study at $200,000.00.
- Both programs come up with identical solutions and reduce the same amount of energy.
- The actual cost of the program is $3,000,000.
- The PC/ESCO is only going to add a 50% margin on the equipment installed.
- The PC/ESCO are adding additional monies to "buffer" the project as an insurance policy in case the predicted savings are not met. (Remember the ESP does not add margins to the project's equipment and does not typically guarantee the project's savings,

thereby eliminating the need for an "insurance policy" on the guaranteed savings.)

- There is no markup on labor. Keep in mind that if a PC company installs their products and uses their in-house installation crews as opposed to using a subcontractor that had to bid the project, the labor cost will most likely be substantially larger.

We'll need construction management and metering and verification services to install the project and to continue monitoring the results. Let's assume:

- Construction management costs will be 10% of the project's cost for both programs.

- To monitor the project's results we are going to include a 5% charge for metering and verification equipment for both programs.

Most PC programs are required to have an economic payback of 10 years or less. These programs typically cannot include non-energy projects and require a "guarantee."[1] An ESP does not have the same restrictions *because the savings are not guaranteed… they are demonstrated and proven to the customer in the proposal phase of the ESP process, and verified by an independent third party of the customer's choosing*. Under an ESP, the financial terms can be longer, the project can also include non-energy related and deferred maintenance projects.

In most cases the PC will only use approximately 70% of their predicted savings to payback the cost of their programs. Again, for the argument's sake we'll assume the PC company is going to use all the savings to payback the program. If a savings guarantee is required by the owner or potential lending institution, an insurance policy for energy savings can be obtained. Policy premiums will be approximately 24% of the annual savings amount being guaranteed. We will use 3% annual added cost to the ESP for a guaranteed savings policy to keep all variables equal in our comparison. This equates to $165,000 over the assumed 10 year term.

With the additional margins on equipment added to the project's costs, the total cost of the PC program is $5,340,000. Adding the Insurance Policy for the ESP brings the ESP total to $3,845,000. This represents

a premium first cost of $1,495,000, or an approximate 28% decrease when compared to a PC.

The primary point to derive from this example is that a guarantee doesn't come without a price. Some guarantees just cost much more than others.

If both programs are financed, the total savings for an ESP compared to a PC option increases to $2.1 million over the term of the contract. The following is a line item breakout of the narrative example just described.

	"PC"	**"ESP"**
Preliminary Engineering Study	$0	$0
Detailed Engineering Study	$200,000	$200,000
Cost of Installing Program	$3,000,000	$3,000,000
Margins on equip & materials and subs (50% markup = 33.3% margin)	$1,500,000	$0
Project Development Subtotal	$4,500,000	$3,200,000
Construction Management (10% of total)	$450,000	$320,000
Monitoring & Verification (5% of subtotal)	$225,000	$160,000
Program Cost Subtotals:	**$5,175,000**	**$3,680,000**
Estimated annual savings from project	$786,000	$786,000
Annual savings used for guarantee to lender (70%)	$550,200	$550,200
Annual amount shared with PC/ESCO for service	$165,000	$0
Insurance premiums for "ESP guaranteed savings"	(Included in PC margin)	$165,000
Total project cost financed:	**$5,340,000**	**$3,845,000**
ESP Program First Cost Savings		**$1,495,000**
IRR (for the customer)[2]	**7.7%**	**15.7%**
Financial Summary[3]		
Annual Payments	$760,296	$547,442
Total ten years interest paid	$2,262,959	$1,629,415
Total program payment amount	**$7,602,960**	**$5,474,415**
ESP Total Program Savings		**$2,128,545**

The statement "it doesn't cost me anything to do a PC program" can be very misleading. The part that doesn't cost you anything ends up as profit on the bottom line for the PC or ESCO. With the same program,

as illustrated above, an ESP will allow you to reduce your payback significantly, include non-energy related or deferred maintenance projects that can be fully or partially paid back with energy savings, or reduce total project cost. In addition, IAQ and water problems can be addressed and incorporated into the program. An ESP relies on an independent "professional service" and not "selling a vendor's product." Therefore, an ESP has fewer limitations to deal with in the process of developing a master facility O&M program. An ESP is designed to augment your staff with energy professionals to help them make the best decision that will produce the most lucrative results for every energy dollar invested.

References

1. Some of these restrictions are driven by state legislation.
2. The internal rate of return (IRR) was calculated using the total project costs and the estimated annual savings for the project. For simplicity, it is assumed that the customer paid for the project's first cost without using financing.
3. Comparative financial analysis based on 7% cost of capital

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ABOUT THE AUTHOR

Michael J. Langton, P.E., CEM, CLEP, CDSM, heads a private consulting firm, Langton Energy Consultants. Since entering the engineering industry in 1982 and earning his P.E. designation in 1987, he has become an accomplished engineer. He founded and was president of his own facility/construction management and consulting engineering company for six years and also managed the MEP department at Lockwood, Andrew and Newnam for three years. His expertise encompasses all facets of engineering design and management, including thermal storage analysis, energy utilization evaluations, telecommunications, and demand-side management. In addition to engineering design and management, he specializes in facility design and evaluation, construction management, and facility management operations.

Michael has been recognized by the Association of Energy Engineers. He received the Region IV "Energy Engineer of the Year" award from AEE in 1993, and was enthusiastically welcomed as president of the North Texas Chapter of AEE in both 1990 and 1996. In 1999, he was selected as vice president of the Lone Star Chapter of AEE.

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