The Fundamentals of
Energy Savings Performance Contracting

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Energy Savings Performance Contracting (ESPC) continues to grow in acceptance and utilization among public building owners and operators (clients) across the nation. Yet the concept suffers from a lack of fundamental clarity regarding the very principals that created the industry and under which successful projects thrive. This appears to be due to the variety of ways providers and users alike implement projects that they call Energy Saving Performance Contracts. This briefing paper is intended to address the very heart of those principles and provide the reader with an understanding of the purpose and benefit of this burgeoning industry.

The U.S. Department of Energy defines ESPC as "The use of guaranteed savings from the maintenance and operations budget (utilities) as capital to make needed upgrades and modernizations to your building environmental systems, financed over a specified period of time."

Origins

Energy savings performance contracting originated in the late 1970s as a means for electric utility companies in the northeastern United States to invest in consumption efficiency. This was in response to the Public Utility Commissions desire to optimize existing utility supply as a condition to approving new energy generation projects.

Providing a contractual vehicle that would promote the replacement of inefficient energy consuming devices and systems with new and more efficient technologies was key to this drive for consumer efficiency. Regulators required that this proposed efficiency be validated by scientific methodology so that the utility companies could prove that these efficiency efforts had tangible, measurable and reportable benefits. When the efforts of efficiency could be demonstrated, quantified and weighed against observed growth, then and only then could the need for new generation resources be justified.

The utilities provided financial incentives to promote the uptake of efficiency to meet their goals, and still clients remained skeptical that their investments in energy upgrades would be a sound investment.

At the same time, the nation was in an economic stranglehold under the Arab Oil Embargo which limited the supply of petroleum resources. Gasoline pump prices skyrocketed along with the costs for petroleum fueled electric generation which was far more prevalent then, than today. Faced with rising energy costs, considerable technical skepticism and a regulatory need to grow efficiency to supplant energy generation investments and costs, clients began to clamor for proof that the claims of efficiency were in fact worthy of the investment they required.

A group of providers were so confident in the technological advancements of their products and services and their ability to demonstrate and validate the energy consumption reductions from these retrofits that they were willing to write a contractual guarantee. These guarantees were supported by the fundamental that if the savings were not able to be delivered as promised, a check would be provided to the client to cover the shortfall. Still, clients were challenged to realize the considerable return from the capital investment into these technological innovations. So confident were the providers that they agreed to enter into shared savings agreements that outlined payment to the provider only from the realized and validated savings demonstrated on the utility bills along with any justifiable base-line modifications. This concept of sharing the

savings further increased the shedding of the risk of performance for the clients by tethering repayment for the capital improvement to the provider, to the realized savings on the energy bill.

These so called "shared savings" contracts however created extraordinary contingent liabilities on the financials of the providers and effectively choked off the growth of the industry. In addition, this concept created the unintended consequence of pitting the client and the provider against one another wrangling for savings instead of working together to achieve a common and projected goal. Much of the focus of this work at the time, as it is today, is within public sector facilities where budgets are fundamentally fixed but more importantly occupancy is stable and reliable. These public entities are known to be minimum credit risks. The Public Market Sector most commonly known as MUSH (Municipal and State Governments, Universities and Colleges, K-12 schools and hospitals) comprised 69 percent of the 2008 revenues of the Energy Services Companies surveyed[1]. (Energy Services Companies (ESCOs) are defined as "business that develops, installs, and arranges financing projects designed to improve the energy efficiency and maintenance costs for facilities over a seven to 20 year time period."). A business solution was needed that bridged the gap between risk aversion and the availability of upfront capital to fund the improvements.

Evolving Financial Structure

To provide the capital source for project implementation and carry the principal until the energy savings from the implemented devices and systems could repay the investment, financial industry experts began to offer Tax Exempt Municipal Leases as an appropriate financing strategy. By providing an escrow account to allow construction draws for work approved and completed and still offering a very aggressive rate structure, municipal leases became the financial mechanism of choice for public sector projects. The nexus of a credit worthy, stable client, reliable payments from the energy savings of the project backed by a guarantee of energy savings performance by the provider and supported by scientific measurement and reported validation made way for continued industry growth.

With a funding source in place and a growing list of providers meeting the financial security, technical and operational wherewithal to support the contractual guarantee, a marketplace of need had met with a solution made to order; complete with a list of benefits that included:

- Single source provider of the engineering, construction and a guarantee of performance
- Comprehensive project development taking into consideration device and system interactions and their effect on equipment sizing and savings projections
- No need for capital dollars or budgeting since the improvements were paid for by the utility dollars that they offset (existing operating budgets)
- Upfront capital to fuel construction funded by financial providers of municipal leases
- Long-term reduction in utility consumption costs
- Hedge against rising utility bills since devices and systems were now as efficient as the technology of the day could provide
- Reduction in maintenance costs since new systems come with warranties and are less likely to need repair than tired and neglected devices and systems they replaced
- Brighter and more comfortable, therefore more productive working and learning environments

[1] Lawrence Berkley National Laboratory report *A Survey of the U.S. ESCO Industry: Market Growth and Development from 2008 to 2011 LBNL-3479E*

- Considerable improvements in Indoor Air Quality further improving working and learning characteristics

Seeing the appeal of capital improvements paid for by energy and operational savings, states across the nation began to enact enabling legislation to insure that their agencies and units of government could participate in these multi-year, alternative procurement financial agreements. Legislation was structured to mirror the very principles on which the industry was founded -- that the facility improvements paid for from the very savings the projects created were protected by the guarantee of providers from the private sector who contractually agreed to "cut a check" if the savings were not realized.

While the concept may have resulted in boundless growth of an industry, individual providers offered individual contracts, concepts and methods to effectively deliver, measure and verify the achievement of savings. There was growing diversity of how to demonstrate the effects of changes in utility rates and uses of facilities and spaces and the considerable impact these changes could make in the clients ability to track the effectiveness of the projects. Space utilization, occupant density, schedule changes for facility or space use, weather changes, office equipment additions and deletions, growing use of computer devices and peripherals even constructed additions are just a few of the events or situations that can impact energy, water and operational needs significantly.

Innovation and Change in the 90s

In the early 1990s, it became clear that the patchwork of methodologies to verify energy savings had caused considerable skepticism as to whether savings were being realized and resulted in slower than projected industry growth. The need for formalized methodology for savings validation prompted the development of the International Performance for Measurement and Verification of Protocol. Even today after multiple revisions, the concepts of Measurement and Verification (M & V) remain largely misunderstood by many clients and providers alike.

The Protocol provides an illustration of best practices for different methodologies depending upon the needs and wants of the contracting parties. One common misunderstanding is the assumption that one of the defined methodologies within the Protocol should be applied to all of the improvements or installed measures; a veritable "one size fits all" concept.

The variety, complexity and sophistication of installed measures should absolutely define the most appropriate validation practices. The M & V protocol and the degree and frequency to which each should be employed for individual measures should be dictated by the pragmatic analysis of the cost for providing the service and reporting weighed against:

- the savings projections,
- risk and responsibility of performance,
- clarity in all assumptions and calculations describing the savings and finally
- the cost of implementing the measures.

And yet, industry reports typically fall considerably short in actually explaining to clients and policymakers the complete picture.

Significant value would come from M & V reports that itemize the conditions, measurements, observations, client input, calculations and assumptions that are considered prior to the execution of an Energy Savings Performance Contract alongside the post construction measurements, observations, and changes that have occurred in the facilities or systems and how they ultimately affect energy consumption. These reports should clearly illustrate the calculations and

assumptions that depict what energy consumption would have been in both units and in dollars and cents should the work not have been performed. In this way, conjecture of non-performance gives way to evidence of success or the contractual remuneration assured by the enabling legislation.

Policymakers and stakeholders would do well to understand and embrace the impact provided by these projects and ultimately hold the providers accountable in the event of a shortfall in the contracted projections. Until all parties associated with these projects begin to demand and subsequently provide the root justification for the very creation of the industry which its improvements are paid for by the savings they create, there will continue to be speculation warranted, or not, as to the effectiveness of funding energy infrastructure modernization through energy savings performance contracting.

ESPC Comes of Age – Infrastructure Modernization and Off-Budget Financing

In today's economic climate, it is paramount that we all strive to do more with less. Yet, some would avoid the costs associated with abrogating the risks of performance through a contractual guarantee and genuine and verifiable Measurement and Verification, for trust in a manufacturer's colorful brochure's claims of efficiency and potential savings. While the information displayed in these claims may be true in many situations, there is jeopardy in assuming that the products and services will be installed and used in exactly the same fashion, term and time for any particular project as was considered appropriate in attracting consumers to buy. Due to the significant shortfall in national revenues, contractors, designers, product manufacturers and consultants are hastening to be the provider of choice to deliver energy solutions. This is particularly true if they can avoid the barriers to market entry of:

- financial security,
- energy expertise,
- the capabilities and methodologies to prove that the savings projected are realized and remain persistent for the term of the payback period and
- the implementation savvy required to stand behind comprehensive solutions with a written guarantee.

Citing one of ESPC's identified best practices, a well-planned and orchestrated team should evolve so that all parties understand and proclaim responsibilities associated with effective maintenance and operating practices of the newly installed devices and systems. These assignments of responsibilities should withstand the comparison to the assumptions made in the original savings projections. In the simplest of examples, it is not uncommon to see dirty air filters on relatively new energy efficient HVAC systems virtually blocking air movement. And while it might be hard to imagine the impact of one filter in one device, these are generally small clues to a more systemic concern regarding the maintenance of systems the lack of which can affect their operational efficiency. Still more common is the correlation between sites that have not effectively created and upheld a responsibility matrix for energy strategies and system monitoring and upkeep and the accusation of poorly performing projects and unrealized savings.

When clients and providers are working in tandem to insure that activities and strategies are maximized to meet the highest levels of efficient operation, then the science of effective design and measurement to validate projections prevail and efficiency as a supply source can become a reality. Clients are rewarded with new equipment and systems. Personnel are trained and therefore updated in their ability to provide tangible services to the sites they so diligently manage, and the onsite concerns diminish or lessen considerably. Spaces become more productive working and learning environments, property values are enhanced through the elimination of long overdue deferred maintenance concerns, and emergency repairs and extraordinary costs are avoided.

Additionally, real jobs are created in the manufacturing and installation of equipment and systems. In turn, this benefits society by restoring personal savings and returning to the disposable income spending that drives our economic engine and financially fortifies the revenues that support our essential community services.

Today, ESPC commonly includes aspects of renewable energy generation and has grown beyond buildings to include energy and water consumers like street lights and traffic signals, asphalt plants, water and wastewater facilities and landfill gas management to mention just a few. With literally billions of dollars of improvements suited to this model, viable examples of statewide programs are being developed that pay for themselves and the resources to manage them. Data systems are evolving to manage complete inventories of facilities and systems to measure and monitor effective energy utilization. And training programs are being developed to assist program implementers with reliable and proven management strategies to insure only the highest quality projects result from this business model where value is determined by life-cycle investment returns, designed, installed and backed by a contractual guarantee.

Over time the industry has produced a vast amount of resources documenting the best practices[1] and the remarkable achievements that have resulted from well managed programs and projects using Energy Savings Performance Contracting. The industry continues to grow at an astounding rate and why not? What other industry or practice can boast the potential to:

- modernize our energy and water consuming systems and facilities,
- eliminate our staggering deferred maintenance obligation,
- reduce our long-term energy consumption and maintenance issues,
- impact national security by reducing our dependence on petroleum imports
- provide environmental stewardship in the reduction of our use of natural resources and
- incite economic development

All this accomplished from the very utility bill budgets annually established and approved without regard to the hidden cost and waste of inefficiency. Substantial benefits with no more financial commitment, no more taxpayer obligation than that required to continue to pay the utility bill year after year.

That's doing all we can with what we've got. That's providing American know-how to the problems we face. That's Energy Savings Performance Contracting.

For more information on Energy Savings Performance Contracting, industry best practices, creating self-sustaining programs and projects, see the Energy Services Coalition @ www.energyservicescoalition.org or contact us at info@energyservicescoalition.org.

[1] http://energyservicescoalition.org/espc/tools/index.html