

**CRITICAL ISSUES SERIES**

## **ENERGY EFFICIENCY IN THE COMMERCIAL REAL ESTATE INDUSTRY**

# Key Steps to Monetizing Building Portfolio Energy Savings Opportunities

ANTHONY J. BUONICORE, P.E., BCEE, QEP  
Managing Director  
Buonicore Partners, LLC

Paper No. 12-002  
July 10, 2012



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Please direct all inquiries to the author at Buonicore Partners, LLC,  
Suite 101, 440 Wheelers Farms Road, Milford, CT 06461,  
800-238-1841, [ajb@bepinfo.com](mailto:ajb@bepinfo.com)

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## INTRODUCTION

Institutional investors are keenly aware of the advantages and cost saving implications associated with energy efficiency improvements to properties in their portfolios. They recognize the opportunity for enhancing profitability, receiving lease premiums, and increasing the asset value of their properties. The average building allocates approximately one-third of its controllable operations budget to energy, making energy expenditure the single largest controllable operating expense. Large and well-known institutional investors, such as CalPERS, the Florida State Board of Administration, TIAA-CREF and Deutsche Bank, have already implemented policies and practices to take advantage of energy savings opportunities to improve risk-adjusted returns in their portfolios.

Traditionally, monetizing energy savings opportunities in a building portfolio has involved conducting energy audits on each of the buildings, evaluating the results and recommended energy conservation measures (ECMs), and then prioritizing capital expenditures to maximize return on investment. As this approach involves a significant up-front expenditure, it is often an impediment to acting promptly.

This paper introduces a more cost effective alternative to screen properties across a portfolio in a technically sound and consistent manner leading to a compelling investment strategy that maximizes financial benefit.

## MONETIZING ENERGY SAVINGS OPPORTUNITIES

Eight key steps are recommended to efficiently monetize energy savings opportunities in a portfolio of buildings. These include:

- Establish a technically sound, consistent energy use and cost baseline for each building.
- Benchmark each building's energy use and cost performance against relevant peer buildings (internal and external peers).
- Prioritize underperforming buildings according to the potential savings, factoring in any business considerations.
- Conduct energy audits on buildings assigned the highest priority (highest potential for energy savings).
  - Determine the optimized bundle of energy conservation measures (ECMs)
  - Identify government/utility incentive programs
  - Project energy savings
  - Determine key financial metrics for both owner-capitalized and externally financed scenarios (ROI, payback term, IRR, NPV, etc.)
- Identify available funding source(s).
  - Leverage the most commercially attractive funding mechanism
  - Assess whether energy savings insurance would be appropriate

- Project implementation (typically working with an energy service company that can guarantee the energy savings).
  - Engineering and design
  - Procurement
  - Installation
  - Commissioning
- Performance measurement and verification (M&V)
  - Energy service company performance guarantee M&V
  - On-going M&V
- Portfolio impact assessment and management.

## (1) ENERGY USE BASELINE

It is essential to first establish a consistent, representative and technically sound energy use and cost baseline for each building. This can be accomplished by collecting and analyzing the information in a standardized format using the ASTM E 2797-11 Building Energy Performance Assessment (BEPA) Standard methodology.<sup>(2)</sup> The ASTM BEPA standard was specifically developed to: (1) define a commercially useful practice for collecting, compiling, and analyzing building energy performance information; (2) facilitate consistency in the collection, compilation, analysis and reporting of building energy use information; and (3) provide that the process is technically sound, consistent, transparent, and practical.

While the collection of utility data may seem relatively straightforward, the devil is in the details. For example, prior to the adoption of the ASTM BEPA Standard, there was no standard time period over which building energy use data had to be collected. Energy professionals typically collected data over a time period that depended largely on the availability of data, e.g., anywhere from one to three years. If a building had undergone a major renovation, there was no standard on how this should be taken into consideration, if at all. There was not even a definition as to what constituted a major renovation. There was no standard on how partial month data collected from a utility should be "calendarized" (converted to a calendar month basis). Some energy professionals used daily averaging, while others utilized complicated weighing factors such as weighting by heating or cooling degree days. There were no standards on where historic weather information should be obtained, how weather conditions should be analyzed and taken into consideration, how building operating hours should be factored into the analysis, or how building occupancy should be considered.

These and other related issues generated considerable confusion in the marketplace and resulted in the commercial real estate (CRE) industry approaching ASTM in 2009 to develop a standardized methodology. The methodology was developed over two years through the ASTM consensus process by a dedicated Task Group of more than 220 professionals, including engineers, architects, attorneys, real estate investors, owners, managers, bankers, equipment manufacturers, educators, government officials and professional associations. The standard was published in February of 2011.

The ASTM BEPA established a standardized methodology for the collection, compilation and analysis of existing building energy use and cost data. Use of the methodology addresses many of the gaps existing in the data collection process and ensures that energy use and cost information collected on each building in a portfolio will be collected and analyzed in a consistent, standardized and technically sound manner.

The following major issues associated with existing building energy use data collection and analysis were codified in the ASTM BEPA standard<sup>(6,7)</sup>:

- *the time frame over which data should be collected* [three years or back to the last “major renovation” if completed in less than three years, with a minimum of one year if reliability criteria are met]
- *the criteria for collecting reliable building energy use data* [refer to Table 1]
- *what constitutes a “major renovation”* [defined as a building renovation that either involves expansion (or reduction) of a building's gross floor area by 10% or more or that impacts total building energy use by more than 10%]
- *how partial month data should be calendarized* [by determining average daily energy usage during each partial month covered, and summing the daily average usage over the number of days in the calendar month]
- *what building energy metrics should be used* [total energy use and its two components: fuel energy use and electricity energy use in kBtu/yr and kBtu/SF-yr; total energy cost and its two components: fuel energy cost and electricity energy cost in \$/yr and \$/SF-yr]
- *how building energy use should be normalized* [by gross floor area in square feet and by using the mean value of the statistically analyzed independent variables that impact energy use in the building energy use equation]
- *how the building energy use equation should be determined* [using ordinary least squares regression of monthly energy use data (fuel and electricity) against the associated monthly values of the independent variables that impact building energy use such as heating and cooling degree days, occupancy, building operating hours, etc.]
- *where historic weather data should be obtained* [from the nearest weather station (to the building) that has historic weather data]
- *what weather data needs to be collected, over what time period and how it should be statistically analyzed* [heating degree days and cooling degree days should be collected for a minimum 10 year period from the weather station nearest to the building with historical data available, and statistically analyzed to determine the 25th percentile, mean and 75th percentile values]

- *what constitutes an appropriate range for the building's energy use* [upper and lower limits should be determined based upon 25th percentile and 75th percentile values for the independent variables in the building energy use equation]
- *what the most representative* (unbiased, normalized) values are for building energy use and energy cost for benchmarking purposes [the ASTM BEPA standard defines these as “pro forma building energy use” and “pro forma building energy cost”].

## (2) BENCHMARKING

Benchmarking the energy consumption and cost of the buildings in the portfolio against that of “comparable” peer buildings is the next step. Conducting an ASTM BEPA on all properties in the portfolio provides a cost effective method to obtain building baseline energy use and cost suitable for benchmarking and eventual prioritization, without the need to perform a relatively expensive energy audit on each building in the portfolio.

Energy performance benchmarking needs to be accomplished using a technically sound, consistent, practical and reasonable approach. This is critical since there is a lot at stake for the property owner. Benchmarking results can have a pronounced impact on a building's competitive position in the marketplace. The benchmarking database must have adequate coverage for all major building type categories and subcategories to provide those relying on this database with a high degree of confidence in the results. A building's “comps” must truly be comparable to the subject building. Table 2 considers some of the questions appropriate to assess the validity of a benchmarking database.

Today, benchmarking is typically accomplished using one or more of the following data sources:

1. U.S. Department of Energy's (DOE) Commercial Building Energy Consumption Survey (CBECS) database.
2. State-developed benchmarking data.
3. EPA's Energy Star Portfolio Manager (ESPM).
4. Energy service company internal benchmarking data (based upon project experience).
5. Commercial benchmarking services.
6. Similar buildings in the owner's portfolio.

### CBECS

The CBECS database is a publicly available national database containing commercial building characteristics and energy use information. Unfortunately, as a database against which to benchmark, its building type coverage is limited. Moreover, the most current energy use data are from 2003 and include data from a limited surveyed population of 5,215 buildings chosen to represent the entire U.S. stock of approximately 5 million commercial buildings.<sup>(10)</sup> The next update of the CBECS database is expected in 2014.

Building type categorization is a key issue in energy performance benchmarking. There must be a statistically acceptable number of “peers” or “comps” for a particular building type to be compared against. In the CBECS database, commercial buildings are categorized (excluding the “vacant” and “other” categories) into 12 very broad categories referred to as “principal building activities” or PBAs. Unfortunately, today there is no standardized way to classify non-residential, commercial buildings. In CBECS, for a building to be considered commercial, at least 50% of its floor space must be used for purposes other than residential, manufacturing/industrial or agricultural. Mixed use buildings are assigned to the PBA occupying the most floor space.

The most common complaint about building benchmarking based on the CBECS database is its inability to account for many of the important (from an energy use viewpoint) differences between buildings in the same general category. Tables 3 and 4 present some of the more recognizable differences in office buildings and hotels, respectively that can impact energy use but which are not considered in CBECS. The CBECS database factors into its energy use intensity (EUI) calculation only the building’s location (in order to take weather into consideration) and size (for gross square footage normalization).

Another inherent limitation in the CBECS database is its bias towards smaller-sized and older buildings. More than one-third the buildings in the database have less than 10,000 square feet and almost three-quarters of the buildings are more than 20 years old, with more than a quarter more than 50 years old. This was an intended bias because the CBECS survey was designed to be representative of commercial buildings nationally, where the number of smaller-sized and older buildings is relatively large. Unfortunately, this puts a building owner with newer, larger buildings, such as may exist in many institutional portfolios, at a disadvantage with respect to the number of “similar” buildings available for benchmarking in the database.

Finally, the CBECS database does not differentiate in the building energy use calculations any extraordinary conditions that may have existed in a building during the time frame covered by the survey. For example, the data used to determine the building’s energy use may not reflect the fact that the vacancy rate for a period of time was unusually high, perhaps due to current market conditions, or that a portion of the building was out of use because of construction or mechanical problems. Not being able to factor such conditions into the EUI analysis can lead to misleading results and conclusions.

The CBECS survey was designed to represent energy use in the commercial building sector nationally, rather than designed to meet the myriad of special needs associated with a true benchmarking database.

## *State Benchmarking Databases*

A number of states have developed or are considering developing their own benchmarking databases. California, for example, developed its own building energy use benchmarking database because they felt it would be more representative of properties in the state. The CBECS database includes only 973 buildings in the entire western region of the country. The California End Use Survey (CEUS), completed in March

2006, was used to develop a peer-group benchmarking database by surveying 2,750 non-residential premises across California, using stratified random sampling across four utility districts, seven major climate zones, 12 general building types and 62 sub-types, and variable building sizes. The CEUS data are more detailed than CBECS and are more representative of California buildings, enabling a higher level of granularity in performance benchmarking.

## *Energy Star*

EPA provides access to its Energy Star benchmarking model through Portfolio Manager, which is available at no cost to the public. It relies on CBECS data from 3,076 buildings across 12 property types (see Table 5). Portfolio Manager allows building owners and managers to input twelve months of energy use data and a select number of building characteristics that can impact energy use, such as location (for weather normalization), size (for gross floor area normalization), weekly hours of operation, number of employees working on the main shift, number of computers, and the percent of floor area that is heated and air conditioned. Portfolio Manager then compares the building’s energy performance with the performance of “similar” buildings across the country and generates an Energy Star rating from 1 to 100. If the building rating is 75, for example, it means that the building performed better than 75% of its “peers” nationwide. Buildings with ratings of 75 or greater are eligible to receive an Energy Star label that can be displayed in the building. Although Energy Star is widely utilized for building energy performance benchmarking, its underlying value contribution has been subject to industry scrutiny principally due to its reliance on outdated CBECS 2003 and 1999 survey data, building type categorization which is considered much too broad, inadequate building coverage (too few buildings represented in each building type category) and the lack of any cost benchmarking data that is highly sought-after by building owners to provide better visibility on what specific cost savings opportunities might exist.

## *Energy Service Company (ESCO) Internal Benchmarking Data*

It is not unusual for ESCOs to have accumulated a significant amount of building energy use data based upon their project experience. For example, many ESCOs that have completed considerable energy retrofit work at hospitals and schools will have valuable energy use information that they use for internal benchmarking. Unfortunately, this information is usually considered proprietary and not publicly available. However, the information, where applicable, is used by ESCOs when retained for energy retrofit project work.

## *Commercial Benchmarking Databases*

In response to the growing industry need for large-scale benchmarking data that can support investment decision-making (and which is not provided by Energy Star), commercial sources of such data are emerging, with particular emphasis on local building energy use and cost data. By benchmarking against local (rather than national) “peer” buildings, CRE owners will have a higher level of confidence to make an investment decision. In local markets, the competition is against other buildings in that market, not against buildings nationally. One

company, Sustainable Real Estate Solutions (SRS), has developed a peer building energy use and cost database involving more than 125,000 buildings in 20 building type categories.(3) The data is current through January 2012, is updated semi-annually and is commercially available. The large number of buildings in the SRS database often enables comparison with “local” comps, rather than “national” comps, resulting in enhanced benchmarking. In addition the SRS database facilitates comparison of a subject building’s performance to relevant peer groups (in the same ZIP code, city, state and climate region) across twelve key performance indicators (EUI, \$/SF) at the total energy, electricity, fuels and water levels.

### *Benchmarking Against Internal Peer Buildings in the Portfolio*

It is not unusual for an institutional investor, such as a Real Estate Investment Trust (REIT) or insurance company or pension fund, to specialize in certain property types. For example, there are REITs that specialize in office buildings. There are other REITs that specialize in hotels, and still others that specialize in retail. Such institutions have accumulated a considerable amount of information on the buildings in their portfolio, which may include energy use and cost information. If energy use and cost information is available, such data can be very useful for benchmarking. Unfortunately, this information may not be publicly available, although it clearly may be used by the institution for its own internal benchmarking purposes.

## (3) PRIORITIZATION

Benchmarking can help identify the largest energy users and worst performing buildings, which are not always one and the same, to establish an energy retrofit prioritization strategy. The priority established should take into account a number of considerations:

- The building’s pro forma (normalized) EUI (determined from the ASTM BEPA) and its two principal components, pro forma electricity EUI and pro forma fuel EUI.
- Potential energy savings determined by comparing the building’s pro forma electricity EUI and pro forma fuel EUI to the median (50th percentile) electricity EUI and fuel EUI of the “peer” building set from the benchmarking database.
- An estimate of the monetary value of the potential energy savings.
- Capital availability.
- Corporate investment criteria, such as ROI, IRR, NPV, etc.
- Equipment at the end of its useful lifetime that is in need of replacement.

### *Enhanced Benchmarking*

In buildings that consume multiple sources of energy such as electricity and fuel, the analysis should include three components, each designed to benchmark the building’s performance vs. its relevant peer group\*. The first component analyzes total energy use (combined electric and fuels), the second its fuel use and the third its electricity use (see Table A).

In a typical portfolio analysis the subject building would be benchmarked using the building’s total potential for energy savings. As can be seen below (cells in green), the building’s total potential for reducing energy consumption vs. its peer group is a relatively insignificant 8%.

Enhanced benchmarking reveals this misleading conclusion is based on fuel consumption that is 48% less (i.e., more efficient) than its peers (cells in red).

As a consumer of electricity, (cells in blue) on the other hand, the subject building is very inefficient, offering the potential for annual savings of \$218,000 (34%) as compared to its peer group median comprised of 79 peer buildings in the same ZIP code (see Exhibit 1 for additional details).

Table A

Building Energy Use	Total	Fuel	Elec
	kBtu/SF	kBtu/SF	kWh/SF
Energy Use Intensity (EUI)	78	14.25	18.7
Peer Group Median EUI	72	27.45	13.97
Building vs. Peer Group Median	6	-13.2	4.73
% Potential Improvement*	8%	-48%	34%
Building SF	199,672	199,672	199,672
Annual Energy cost	\$985,683	\$120,517	\$865,166
Energy Cost / SF	\$4.94	\$0.60	\$4.33
Peer Group Cost / SF	\$3.54	\$0.71	\$2.83
Potential Savings*	\$73,722	none	\$217,919

\* compared to peer group median comprised of 79 peers in same ZIP code

From the foregoing analysis the benefits of enhanced benchmarking can be readily determined. Failure to investigate the impact of individual energy sources on a building’s energy efficiency can easily mask significant savings opportunities. As a result such a building could inadvertently be assigned a low priority while other buildings in a portfolio will be deemed more deserving of investment, thereby driving an inefficient use of capital.

\*A “peer group” is a set of buildings within the same geographic area (ZIP code, city, climate region, etc) as the subject building having similar building characteristics.

## (4) ENERGY AUDIT

A key to making energy efficiency investment is the ability to identify energy savings opportunities and project energy savings with a high degree of confidence. An energy audit for each high priority building in the portfolio audit will accomplish this.<sup>(6)</sup> Such audits typically follow guidelines established by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). ASHRAE Level II comprehensive energy audits or Level III investment grade energy audits are commonly relied upon in energy retrofit projects.

The energy audit typically evaluates all major energy-using systems, including the building envelope, lighting, energy management systems, and heating, ventilation and air conditioning equipment. The audit also identifies ECMs and includes detailed energy cost savings calculations, projected retrofit cost and ECM financial metrics such as return on investment, payback term, IRR and NPV along with specific recommendations. As part of the audit, the existence of any available government and utility incentives that can improve the ROI are identified.

## (5) FUNDING

Once the energy audits are completed, ECMs finalized, total installed project cost determined, and the payback time established, financing the project is the next consideration. There is no “one size fits all” solution for financing energy efficiency retrofit projects; but there are a number of considerations a building owner needs to assess to determine the most appropriate financing mechanism, including:

1. Total cost of the improvement project;
2. Constraints on internal capital availability;
3. Balance sheet considerations (whether or not “off-balance sheet” funding is preferred);
4. Preferred payment structure;
5. Preferred ownership status of the improvements and tax implications;

Each of these factors needs to be carefully evaluated early in the energy efficiency financing decision-making process.

Depending upon how energy efficiency improvements will be financed, serious consideration should be given to how (or if) the costs can be shared with building tenants who may enjoy most of the benefit through lower utility bills. Transitioning to “green” leases, for example, could facilitate this effort. Fortunately, new financing options<sup>(1)</sup> have emerged that enable energy savings improvement costs to be passed on to tenants, along with the savings, and under commercially attractive terms that can insure the project is cash flow positive and a “win-win” for both tenants and owners. Notwithstanding, the most appropriate financing solution will likely be that which has been specifically tailored to meet the need.

The energy efficiency financing mechanisms generally relied upon today are identified below.

### *Internal Financing*

The most direct way for building owners to pay for energy efficiency improvements is to allocate funds from an internal capital (CapEx) or operating budget. The majority of energy efficiency projects completed in the commercial real estate market to-date have relied on internal financing. It is the simplest and most straightforward option administratively.

### *Debt Financing*

Direct financing through banks or other types of lenders is an alternative to internal funding. In the loan decision-making process, the building owner’s (borrower’s) creditworthiness is of paramount importance as lenders will typically rate the borrower’s ability to repay the loan at the highest end of the “creditworthiness” spectrum. Building owners also need to be aware that codicils in their existing mortgage may present an obstacle to borrowing for energy efficiency improvements, in that loan covenants may restrict the addition of further debt.

### *Lease/Lease Purchase Agreements*

Equipment leasing and lease-purchase agreements can provide the building owner with a means to reduce or avoid the up-front capital investment for energy efficiency improvements. These agreements are routinely offered by commercial leasing companies, management and financing companies, banks, investment firms and equipment manufacturers.

### *ESCO Financing Under Energy Savings Performance Contracts*

An ESCO represents a one-stop shop for project development and installation. Many large ESCOs with significant financial resources (such as Johnson Controls, Honeywell, Siemens, Eaton, Schneider Electric, Chevron Energy, Trane, Ameresco, etc.) also provide project financing. Projects are typically large-scale with the contract period covering a 5-10 year period or longer.

Various types of energy savings performance contracts (ESPCs) exist, including “shared savings” contracts, “paid from savings” contracts, and “guaranteed savings” contracts. Under typical ESCO contracts, newly installed equipment is financed, owned and maintained by the ESCO. Ownership transfers to the building owner at the end of the ESPC period. It may be accomplished by either a purchase at fair market value or the building owner may simply assume ownership of the equipment that has been paid for during the ESPC term. The majority of ESPCs are financed through savings generated by reduced energy consumption.

With the “shared savings” contract, the dollar value of the measured energy savings is divided between the building owner and ESCO. If no energy cost savings are realized, the owner continues to pay the energy bill, but does not incur any expense to the ESCO for that period. In the “paid from savings” contracts, the building owner pays the ESCO a predetermined amount each period (for example, an amount equal to 80% of the expected energy bill had the improvements not been made). Under “guaranteed savings” contracts, the ESCO guarantees that energy cost savings will exceed an agreed upon minimum dollar value. To ensure a positive cash flow to the owner during the ESPC term, the guaranteed minimum savings typically equals the financing payment for the same period. ESCO pricing often includes a fee that covers on-going monitoring, measurement and verification costs and a premium for assuming underperformance risk.

### *Energy Services Agreements*

A number of innovative managed energy services agreement (ESA) structures are now being offered by third parties who develop projects, arrange or provide the capital, and manage the installed equipment. These typically are pay-for-performance solutions where energy efficiency is essentially being sold as a service. Energy efficiency service providers are compensated only if energy savings are realized. Building owners have no upfront cost, no capital requirement, and 100% of the project cost is financed. The ESA provider assumes ownership and maintenance responsibility for project assets over the lifetime of the project. Payments to the energy efficiency service provider are viewed as a “pass-through” operating expense (to building tenants).

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There are a growing number of energy efficiency service firms offering pay-for-performance financing solutions under ESAs, including SCInergy/Transcend Equity Development (founded in 2002, Dallas, TX), and Metrus Energy (founded in 2009, San Francisco, CA).

Under the Transcend model, building owners pay Transcend a service fee based on historical energy costs. Transcend, in turn, pays the utility bill and earns its fee from savings generated by the efficiency improvements. The Transcend fee becomes an operating expense (pass-through to tenants) that replaces the utility bill and the building owner incurs no debt. At the end of the ESA term (typically 5-10 years), title associated with the improvements passes to the owner. If the building is sold, the contract can be assigned to the new owner (or terminated if preferred). Transcend will typically enter contracts where they envision at least a 25% savings on the current utility bill. The company's ideal customer has a minimum aggregate space of 250,000 square feet, associated with one or more buildings.

Under the Metrus model, in contrast, building owners maintain responsibility for payment of their reduced utility bills (which directly benefits tenants in a multi-tenant property) and pay Metrus's fee (which is a pass-through operating expense paid by the tenant) out of the delivered energy savings. The Metrus fee is structured as a per-unit-saved payment (i.e., a price per avoided kilowatt hour of electricity and/or avoided therm of natural gas), where the price for energy unit savings is set at a level below the prevailing utility price per unit of energy consumption. This arrangement establishes energy efficiency as a resource and is akin to a solar power purchase agreement, where the customer has no project performance or technology risk and pays only for realized, measured and verified energy savings. Metrus retains ownership of all project-related assets for the duration of the ESA term. At the end of the contract period, clients can purchase the equipment for fair market value. Metrus works with ESCO partners and typically prefers clients that have approximately \$1 million or more in combined electricity and natural gas costs annually.

#### *Property Assessed Clean Energy (PACE) Programs*

PACE programs, also referred to as tax-lien financing, allow local governments, when authorized by state law, to fund energy improvements on commercial and industrial properties via an assessment on the property tax bill. The longer term of such financing (typically 10 to 20 years) yields a considerably lower cost of capital and projects that are cash flow positive. PACE financing also transfers with sale of the building so that future owners or tenants assume the payments while at the same time receive the savings benefit.

Recently launched PACE programs in San Francisco and Los Angeles are using what is being referred to as an "open market" model (or also referred to as a "private placement" or "owner arranged" model) where financing may be provided by private investors, which could be banks or pools of funding raised from investors. This is expected to be a very attractive model in the commercial real estate (CRE) market. The municipality acts as a conduit for private investment. Individual property owners arrange their own financing directly with the project lender leveraging the enforceability of the tax lien on the property as security. This enables building owners to negotiate rates,

terms, conditions, and schedules that best suit their specific project needs, rather than waiting to lock in a rate through a bond. The owner-negotiated terms are then reflected in a loan agreement directly with the lender. Financing is repaid as a line item on the owner's property tax bill. The repayment obligation transfers with ownership.

In the CRE industry, where there are a significant number of triple-net lease tenant-occupied properties, a significant advantage to these PACE assessments is that they normally qualify as operating expenses under existing leases and, therefore, are eligible "expense pass-throughs" to tenants. Under typical triple-net lease agreements where tenants are responsible for utility costs, the pass-through of the PACE assessment as a tax reimbursement allows owners to implement projects and equitably share project costs with the tenants who in return reap the benefit of lower energy cost.

The security of the tax lien also provides a solution to the inability of a building owner, who may lack an investment-grade credit rating, to secure third party financing for energy retrofits. The lien is attached to the property and transfers with ownership. Repayment security is through the senior lien position of the assessment rather than through the building owner's (borrower's) credit. This allows owners to undertake deeper retrofits with greater energy savings and longer payback periods, even if the owner only plans to hold the property for a few years.

The process of owner-arranged PACE financing begins when the building owner engages an ESCO to audit the property and develop a retrofit plan. The owner then submits the plan to the municipality for approval, in some cases along with a lien consent letter from the mortgagee. Once the municipality notifies the owner of approval, the owner can negotiate financing from lenders on advantageous terms due to the security of the lien, which will be placed on the property when funding is provided. The owner will then typically enter into an energy savings performance contract with the ESCO, and the lender pays the ESCO to perform the installation. The municipality assigns the assessment collection rights to the lender, and the building owner pays the assessment according to the agreed upon schedule. The ESCO provides operation and maintenance (O&M) and energy savings measurement and verification (M&V) for a service fee and pays the building owner if verified savings fall short of the energy savings guarantee.

Typical PACE tax-lien financing structures make it possible to have the reduced monthly energy bill (reflecting the energy savings) more than offset the additional charge (for loan repayment) on the property tax bill, resulting in positive cash flow immediately. To date, 28 states and the District of Columbia have passed enabling legislation enacting PACE programs. Lenders, ESCOs and energy service agreement providers can all work through PACE programs to provide more commercially attractive terms to clients.

#### *"On-Bill" Utility Financing*

Utility bill financing ("on-bill" financing) is a financing alternative under which the utility or a third party financier provides the upfront capital for an energy efficiency upgrade. In turn, the building owner

repays the investment through a charge on their monthly utility bill. Most of these programs offer low or no interest loans over relatively short repayment periods. The primary objective of the utility through this incentive is to lower peak demand. Currently there are 31 “on-bill” financing programs in 20 states, although most of these programs are relatively new, with many still in the pilot phase.

## *Energy Savings Insurance*

Energy efficiency investments may be constrained by the uncertainty associated with projected energy savings and whether or not these savings will actually be realized. This perceived risk of underperformance may pose a barrier to investment in energy efficiency retrofit projects. A means to reduce this underperformance risk is through energy savings insurance (ESI).<sup>(5)</sup> Such insurance may provide a solution that can facilitate financing and eliminate any underperformance risk concerns of the building owner. One company, Hannover Re, a leading international reinsurance company working with Energi Insurance Services (Peabody, MA) has recently launched an ESI product for ESCOs known as the “Energy Savings Warranty”.

## **(6) PROJECT IMPLEMENTATION**

Project implementation is generally the responsibility of the energy service company retained specifically for this purpose. Implementation consists principally of four major steps:

1. ECM engineering and design.
2. Development of an M&V Plan.
3. ECM installation.
4. ECM commissioning.

## **(7) ENERGY SAVINGS MEASUREMENT & VERIFICATION (M&V)**

After the ECMs are installed, a key to determining project success is the ability to verify performance (energy savings) in a technically supportable, consistent and transparent manner with a high degree of confidence. To accomplish this, energy service companies typically rely on the guidance provided in the International Performance Measurement and Verification Protocol (IPMVP) document.<sup>(4)</sup> The IPMVP is intended for use by energy professionals as a basis for establishing energy savings.<sup>(9)</sup> It presents a framework and defines terms needed to determine energy savings after implementation of a project. It also specifies the contents of the M&V Plan that must be prepared, adhering to the principles of accuracy, completeness, conservativeness, consistency, relevancy and transparency.

For ESCOs, the M&V Plan becomes part of the energy savings performance contract, and defines the measurements and calculations to determine payments or demonstrate compliance with the guaranteed level of performance.

M&V is not a one-time occurrence (performed to validate the energy savings guaranteed under the performance contract after the ECMs

have been installed), but rather an on-going responsibility. The goal is to maintain equipment properly to ensure optimum performance and verify on a regular basis (e.g., annually) that the energy savings are continuing to be achieved.

## **(8) PORTFOLIO IMPACT ASSESSMENT**

After the energy retrofit project is completed and the energy savings verified, the impact assessment generally includes answering the following questions:

- Did the results meet expectations? If not, why not?
- Would any of the ECMs installed be appropriate for other (lower priority) buildings in the portfolio?
- Where does each building’s energy performance now rank in the portfolio?
- How much of a reduction in carbon emissions was achieved in the portfolio?
- Are any of the buildings eligible to receive an Energy Star label?
- Should LEED-Existing Building: Operations and Maintenance (LEED-EB:O&M) certification be pursued?
- Is there an opportunity to increase lease price per square foot based on the lower energy costs?
- How much value has been added to each building? To the portfolio?
- What positive publicity can be generated?

## **IMPLEMENTATION ALTERNATIVES**

Energy retrofit project responsibility for the various steps described above may be allocated in a number of ways. If the institution owning the portfolio of buildings has experience with the management and implementation of energy savings projects, it may perform several of the steps on its own, such as collecting building energy use and cost data using ASTM BEPA methodology, performance benchmarking to peer buildings and/or evaluating funding options. A building owner can contract out the energy audits and ECM engineering, design and installation.

Notwithstanding, serious consideration should be given to retaining an experienced ESCO or energy service provider to take total responsibility for the project, from conducting the energy audit, to providing (directly or indirectly) the funding, to completing the installation and measuring and verifying the energy savings. The up-front work of collecting energy use and cost data, performance benchmarking to relevant peers and retrofit prioritization will likely remain the responsibility of the building owner since there often are internal strategic business considerations that may influence the decision-making process for prioritization. Moreover, keeping the up-front work separate from the ESCO’s responsibilities can avoid placing the ESCO in a potential conflict of interest situation.

## ENERGY CONSERVATION POLICIES

After executing a comprehensive energy savings retrofit initiative for a portfolio of properties, it is recommended that a number of policies be in place. These include:

1. A *building operations and maintenance protocol* to insure on-going optimum performance (in accordance with the manufacturer's specifications) of energy-using systems such as heating and air conditioning units, boilers, chillers, etc.
2. An *equipment replacement policy* that dictates priority be given to purchase only high efficiency systems. (If energy-using equipment is at the end of its useful life and in need of replacement, this replacement would typically be given the highest priority in any energy retrofit program.)
3. An *energy conservation policy* that will insure, to the maximum extent possible, energy is not wasted in routine building operations, particularly by tenants (who under most lease terms have responsibility for energy costs).

## CONCLUSION

Institutional investors, building owners and managers with large real estate portfolios are increasingly interested in improving the energy efficiency of their holdings because they recognize the opportunity for boosting profitability and increasing asset value. Many different approaches are available to accomplish this. The eight step process presented in this paper provides a technically sound, consistent and cost effective methodology to monetize energy savings opportunities in a portfolio of buildings. The process incorporates use of three standard protocols: (1) the ASTM E 2797-11 Building Energy Performance Assessment (BEPA) Standard that focuses on energy data collection and analysis to provide a standardized energy use and cost baseline; (2) ASHRAE Level II and Level III Energy Audit Guidelines to determine the optimized bundle of ECMs and the associated key financial metrics; and (3) the International Performance Measurement and Verification Protocol (IPMVP) guidance document to measure and verify energy savings post-retrofit.

In addition to the monetary advantages, improving the energy efficiency of properties in building portfolios will also have other advantages. For example, public companies under pressure from shareholders advocating responsible action on climate change can report company actions to make their owned or leased real estate significantly more energy efficient (translate: "greener"). Clearly it is an all-around win-win situation!

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## AUTHOR BIOGRAPHY



### **Anthony J Buonicore, P.E.**

Anthony Buonicore is a past president and Fellow Member of the Air & Waste Management Association, a Diplomat in the American Academy of Environmental Engineers, a Qualified Environmental Professional and a licensed professional engineer. He is a member of the ASTM Property Environmental Due Diligence committee, former chairman of its ASTM Phase I Task Group, and currently chairs the ASTM Task Group that developed the U.S. standard for vapor intrusion screening for properties involved in real estate transactions. In addition, Mr. Buonicore is chairman of the ASTM Task Group responsible for developing the new Building Energy Performance Assessment and Disclosure Standard.

Mr. Buonicore has been a leader in the energy-environmental industry since the early 1970s, serving as General Chairman of the American Institute of Chemical Engineers' First National Conference on Energy and the Environment in 1973 and as founder and first chairman of the Air Pollution Control Association's Energy-Environmental Interactions Technical Committee in 1974. He pioneered the use of refuse-derived fuel pellets (a bio-fuel) mixed with coal in stoker-fired boilers and has written extensively on energy and environmental issues.

As a Managing Director of Buonicore Partners, LLC, Mr. Buonicore is responsible for management of the firm's commercial real estate holdings and all due diligence activities associated with property acquisition. He holds both a bachelor's and a master's degree in chemical engineering.

## **TABLE 1. ASTM E 2797-11 QA/QC CRITERIA FOR BUILDING ENERGY USE DATA COLLECTION AND ANALYSIS**

1. No "major renovation" (defined as involving expansion (or reduction) of the building's gross floor area by 10% or more, or as impacting total building energy use by more than 10%) should have occurred in the 12 month period over which the data was collected.
2. Proper calculation of building gross floor area.
3. Weather normalization based upon at least 10 years of heating degree day and cooling degree day data from the nearest weather station (to the building) having this historical data.
4. All non-weather independent variables (such as vacancy rate and building operating hours) collected each month in the 12 month period should be within 15% of the average monthly value determined by statistical analysis of three year's worth of data, assuming the data is available.
5. Space where a tenant has left but continues to pay the rent in accordance with the lease should be viewed as vacant space.
6. Confirmation of building data and characteristics by a qualified professional.

## **TABLE 2. SUGGESTED QUESTIONS TO EVALUATE THE VALIDITY OF A BENCHMARKING SYSTEM**

1. How many "peer" buildings are in the benchmarking database?
2. Is there a statistically supportable number of "peer" buildings that can establish a confidence level?
3. How many of these "peer" buildings are located in the same geographic area?
4. How current is the energy use and cost data collected for these buildings?
5. What QA/QC has been performed to insure accurate data input?
6. How similar are the design and characteristics of the "peer" buildings being benchmarked against?
7. How transparent is the benchmarking database when a building is benchmarked?

### TABLE 3. BUILDING CHARACTERISTICS WITHIN THE OFFICE BUILDING PBA THAT CAN IMPACT ENERGY CONSUMPTION FOR BENCHMARKING

- Location (weather conditions)
- Size (gross floor area)
- Occupancy
- Hours of Operation
- Age
- Surroundings
  - Stand-alone (unattached)
  - Attached to another building on one side
  - Attached to another building on two sides
  - Attached to another building on three sides
- Parking
  - Attached indoor parking garage
  - Attached outdoor parking garage
  - Unattached parking garage
- Height of the Building
  - Short
  - Tall
- Building Footprint
  - Outside wall exposure
- Tenant PBA
  - 100% office (with/without a data center)
  - Mixed Use
    - With retail space
    - With residential space
    - With hotel space
- Backup Power Supply

**TABLE 4. BUILDING CHARACTERISTICS WITHIN THE LODGING PBA THAT CAN IMPACT ENERGY CONSUMPTION FOR BENCHMARKING**

- Type
  - Standard hotel rooms
  - Suites
  - Combination
  - On-site laundry facilities
- Amenities
  - Conference facilities
  - Restaurant/kitchen facilities
  - Swimming pool facilities
  - Health club/spa facilities
  - Atrium and public lobbies
- Location (weather conditions)
- Size (gross floor area)
- Occupancy
- Age
- Surroundings
  - Stand-alone (unattached)
  - Attached to another building on one side
  - Attached to another building on two sides
  - Attached to another building on three sides
- Parking
  - Attached indoor parking garage
  - Attached outdoor parking garage
  - Unattached parking garage
- Height of the Building
  - Short
  - Tall
- Building Footprint
  - Outside wall exposure
- Tenant PBA
  - 100% lodging
  - Mixed Use
    - With retail space
    - With residential space
    - With office space
- Backup Power Supply

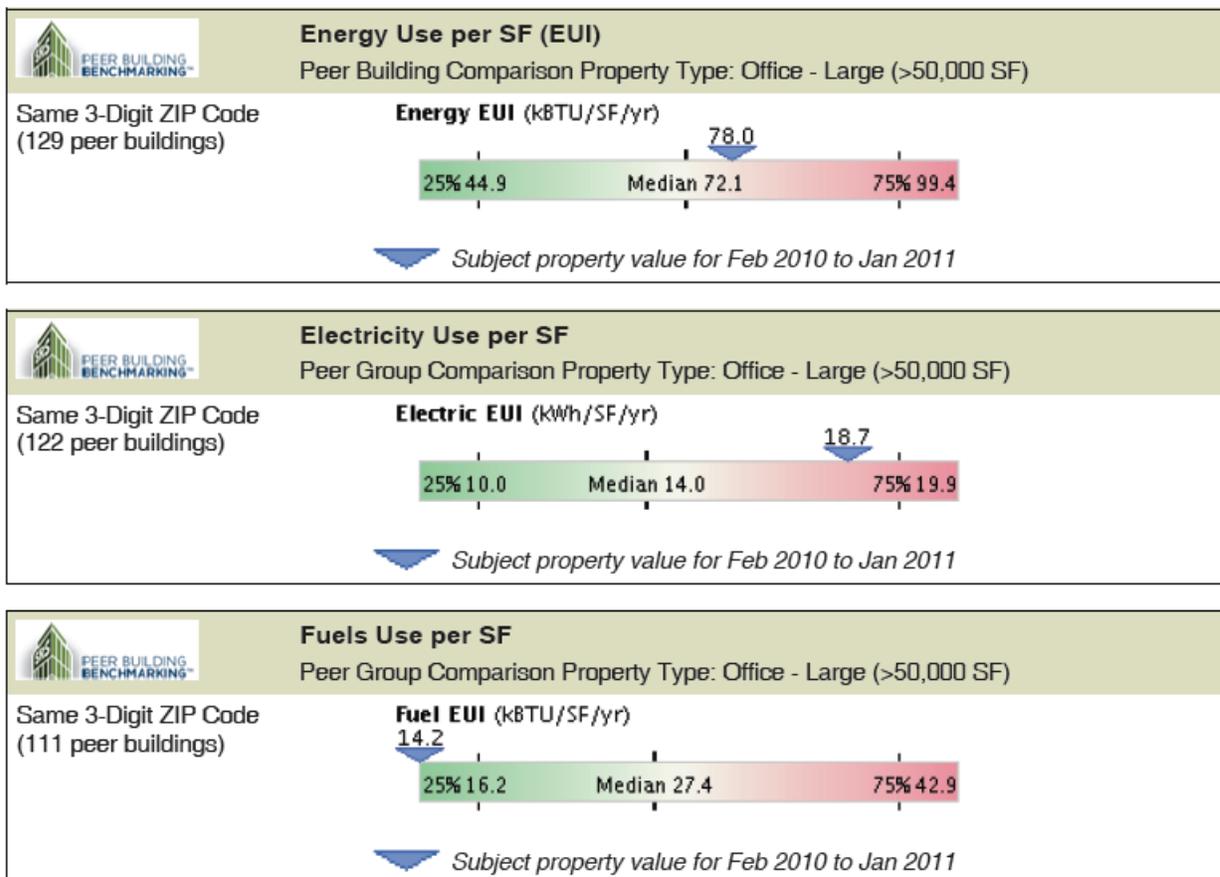
## TABLE 5. BUILDING TYPE CATEGORIES IN ENERGY STAR PORTFOLIO MANAGER

- OFFICE/BANK/FINANCIAL INSTITUTION/COURTHOUSE
- DATA CENTER
- HOSPITAL
- HOTEL
- HOUSE OF WORSHIP
- K-12 SCHOOL
- MEDICAL OFFICE
- RESIDENCE HALL/DORMITORY
- RETAIL STORE (OTHER THAN MALLS)
- SENIOR CARE FACILITY/NURSING HOMES
- FOOD SALES/GROCERY/SUPERMARKET
- WAREHOUSE/STORAGE

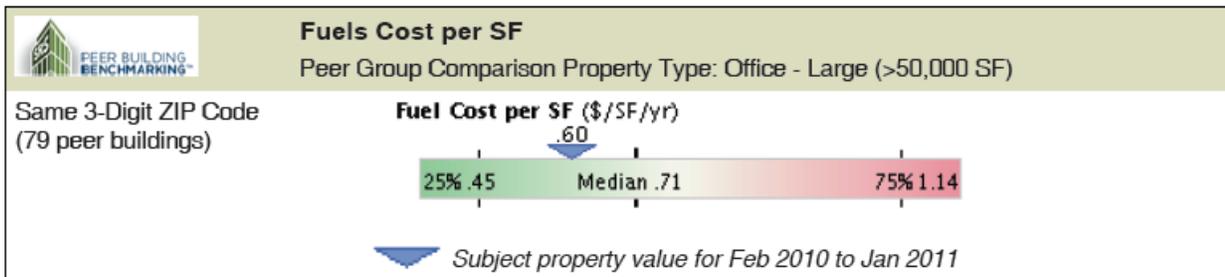
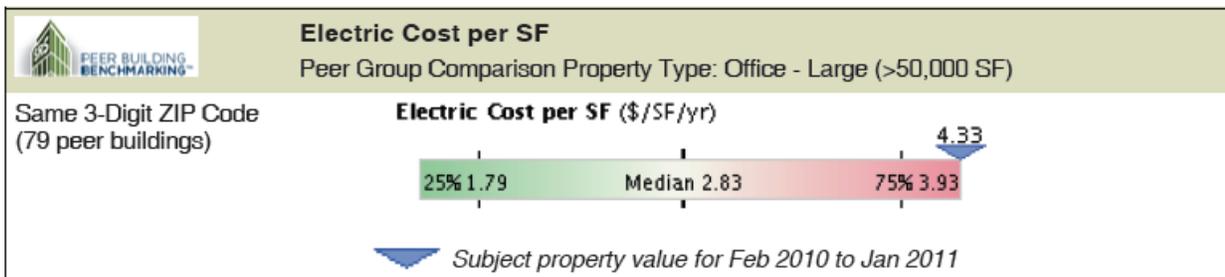
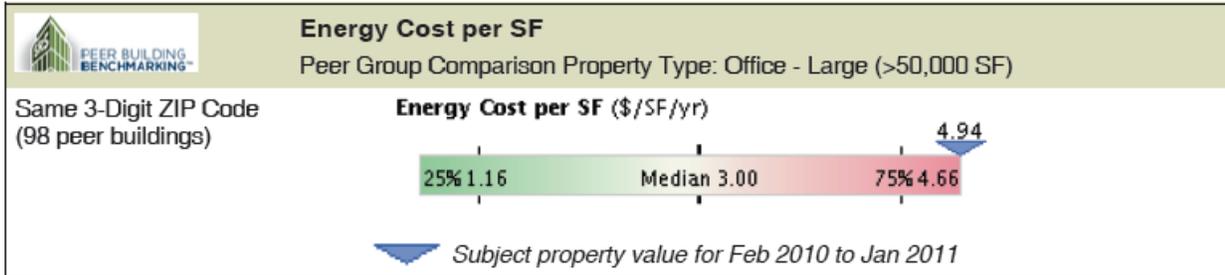
## EXHIBIT 1.

### EXAMPLE ENERGY USE & COST PERFORMANCE BENCHMARKING AGAINST LOCAL PEER BUILDINGS

#### TOTAL ENERGY, ELECTRIC & FUELS EUI BENCHMARK COMPARISONS TO SAME ZIP CODE PEER GROUP



**TOTAL ENERGY, ELECTRIC & FUELS \$/SF BENCHMARK COMPARISONS TO SAME ZIP CODE PEER GROUP**



# Key Steps to Monetizing Building Portfolio Energy Savings Opportunities

## SUMMARY - TOTAL ENERGY, ELECTRIC & FUELS EUI BENCHMARK COMPARISONS TO SAME ZIP CODE PEER GROUP

 <b>Peer Building Benchmarking - Energy Use</b> Property Type: Office - Large (>50,000 SF) Peer Group: Same 3-Digit ZIP Code (79 peer buildings)				
Key Performance Metric	Subject Property Total Use per SF Feb 2010 to Jan 2011	Peer Group Benchmark Median Use per SF	Subject Property % Better / (Worse) Than Peer Group Median	Subject Property Potential Annual Cost Savings vs Peer Group Median (\$/yr)
Electricity Use Intensity	18.67 kWh/SF	13.97 kWh/SF	<b>(34%)</b>	\$217,919
Fuels Use Intensity	14.25 kBtu/SF	27.45 kBtu/SF	<b>48%</b>	N/A
Energy Use Intensity (EUI)	77.96 kBtu/SF	72.13 kBtu/SF	<b>(8%)</b>	\$73,722
Water/Sewer Use Intensity	20.51 gal/SF	20.00 gal/SF	<b>(3%)</b>	\$482
<i>SRS Peer Building Benchmarking data is current through May 2011</i>				
As compared to its peer buildings median annual electricity use per square foot, the electricity use at the subject property is 4.70 kWh/SF/yr more than its peer group. If the performance of the subject property was improved to meet the median electricity performance of its peer group, the subject property has the potential to reduce its annual electricity cost by \$217,919.				

**TOTAL ENERGY, ELECTRIC & FUELS \$/SF BENCHMARK COMPARISONS TO SAME ZIP CODE PEER GROUP**

 <b>Peer Building Benchmarking - Utility Cost</b> Property Type: Office - Large (>50,000 SF) Peer Group: Same 3-Digit ZIP Code (79 peer buildings)					
Utility Type	Subject Property 12 Months Spend Feb 2010 to Jan 2011	Subject Property Cost per SF (\$/SF/yr)	Peer Group Benchmark Median Cost per SF (\$/SF/yr)	Subject Property % Better / (Worse) Than Peer Group Median	Subject Property Potential Annual Cost Savings vs Peer Group Median (\$/yr)
Electricity	\$865,166	\$4.33 / SF	\$2.83 / SF	<b>(53%)</b>	\$300,038
Fuels	\$120,517	\$0.60 / SF	\$0.71 / SF	<b>15%</b>	N/A
Water/Sewer	\$19,393	\$0.10 / SF	\$0.18 / SF	<b>46%</b>	N/A

*SRS Peer Building Benchmarking data is current through May 2011*

As compared to its peer buildings median annual electricity cost per square foot, the electricity cost at the subject property is \$1.50/SF/yr more than its peer group. If the performance of the subject property was improved to meet the median electricity performance of its peer group, the subject property has the potential to reduce its annual electricity cost by \$300,038.



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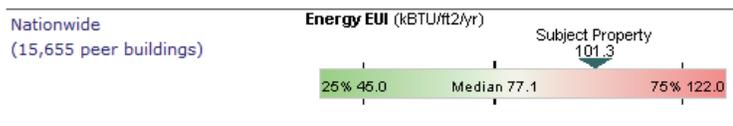
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Peter L. Cashman • [pcashman@bepanews.com](mailto:pcashman@bepanews.com) • 1-800-226-9094  
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