

The Context for Successful Energy Efficiency Programs Serving Commercial Buildings

With the exception of new building standards reinforced by financial incentives and occasional mandates, the United States has not enjoyed success in stimulating significant energy efficiency retrofits in commercial buildings. Mandatory benchmarking in some cities—New York, the District of Columbia, Seattle and San Francisco—has been enacted for large buildings and may have a market impact in those cities. But a more robust impact would follow from mandatory building standards. Mandatory standards would do for buildings what appliance and fuel economy automobile standards have done for those industries—occasioned 25-40% reductions in energy demand within a decade. But there is not yet the political support for mandatory existing building standards, and there is too much building owner skepticism, lack of knowledge, undocumented retrofit investment results, financial barriers and split incentive problems to engender near term optimism for such a dramatic policy initiative to be taken seriously—and enforced.

It will take perhaps a decade to mobilize the political will to mandate existing building standards, arguably the only feasible way to achieve energy savings in the 25-40% range across the buildings sector within the next 25-30 years. However, the ambitious goals set by our national, state and local governments to reduce energy usage and greenhouse gases cannot be met with a gradual, incremental approach to prompting energy efficiency investments and the consensus required for mandatory existing building standards will not develop.

Yet there are strong entrenched interests opposed to mandatory existing building standards. Owners, realtors, and lenders lead the professions mobilized to undermine policy proposals for mandatory standards. For each of these interests, the strong perception is one of costly regulatory burdens imposed without offsetting benefits. Even local governments bristle at the concept of overburdened building inspectors taking on yet another unfunded mandate. Without strong, indisputable evidence that energy efficiency investments are sound, savings are measurable and sustained, and real estate appreciation is attainable, the political support for mandatory existing building standards will remain weak.

A Report on Accelerating Commercial Building Energy Retrofits



If the emerging mandatory commercial building labelling and disclosure programs are to be successful in triggering significant energy efficiency investments, and if residential building labelling and disclosure programs can be mandated, we must first develop an understanding of what comprises successful energy efficiency programs. It is noteworthy that today the only US “marketplace” for an energy efficiency services industry is in the so-called “MUSH” sector, municipalities (and other government buildings), universities, schools and hospitals. These are the most regulated of building owners, reliant primarily upon taxpayer funding, and lacking the resources to invest in energy-related capital improvements. Ten to fifteen regional and national companies, known as energy services companies, provide a one-stop service, identifying cost-effective energy efficiency measures, securing third party financing, hiring and overseeing installation contractors, guaranteeing savings, monitoring long-term utility costs, and providing annual training for maintenance staff to assure the persistence of savings. Energy performance contracting statues passed by state governments enable this industry to thrive, now approaching eight billion dollars in annual revenues.

Outside of the MUSH sector and public housing, energy performance contracting is rare and there is no effective energy efficiency services marketplace: Virginia and Maryland—indeed the US-- lacks a significant one-stop contracting, comprehensive retrofit industry, or readily accessible financing. Nor are there demonstrated savings results across residential neighbourhoods or commercial districts, or even for specific building types. The barriers—discussed in the next section—are too formidable. Comprehensive building treatments for all cost-effective measures, regardless of fuel type, does not happen outside of a few US Department of Energy pilot programs.

Commercial Buildings Investments in Energy Efficiency: Overcoming the Barriers

Energy efficiency programs have had a limited impact on commercial customers in the past two decades nationwide. Before one crafts program designs, incentive structures, and marketing strategies in Virginia and Maryland, we must better understand what factors inhibit customers from moving forward. The major barriers to energy efficiency investments for these building owners are:

- Lack of access to financing;
- Complex decision-making in many ownership structures
- Split incentives between owners and tenants;
- Lack of information
- Lack of trust in contractors and in the performance of ECMs;
- Short time horizons



Depending upon a number of factors—building size, ownership type, metering configuration, length of tenure, economic viability—some of these challenges are more burdensome than others. And in the current economic climate, access to capital, willingness to borrow, and creditworthiness move to the top of the list for many building owners. Discussion of barriers also underlines the important task of understanding the commercial sector as a set of largely separate subsectors, deserving of customized program designs and marketing strategies. Attention should turn first to the dilemma of financing.

Access to Financing

In the commercial sector, the credit-challenged candidates which stand out are new businesses, small businesses, and large office buildings occupied primarily by tenants. All of these buildings and their occupants will have problematic balance sheets, as retail businesses slowly recover from their economic woes, and office buildings have recently experienced higher vacancies, lower rents, declining equity, and shorter cash positions. As we shall see in the discussion of particularly the split incentive problem plaguing this sector, most commercial buildings face significant barriers to investments in energy efficiency in the best of times; in a sluggish economic climate, these barriers are even greater. Ironically, the most attractive candidates for financing in this environment are institutional and government buildings—always strapped for cash, but on the receiving end of government subsidy and tax exempt debt in a healthy energy performance contracting marketplace.

Complex Decision-making and Time Horizons

Commercial building owners characterized by ownerships other than institutional—insurance companies, pension funds, labor unions—have complicated or multi-layer decision-making structures. Efficiency program managers must convince first property management companies, then general partners, and then limited partners to gain a decision for financial investments above a prescribed minimum. Each of these three has different financial interests, and varying time horizons. Time horizons of limited partners are frequently three years or less, limiting applicable measures to paybacks of this length. Many ownership structures of this kind are motivated to flip their buildings, or take out their equity, in this time frame. Except for common area lighting, water conservation measures, and some controls, very few measures can meet this time parameter. And the six months to one year process between audit visit and final decision from the decision-maker adds a transaction cost that many contractors are unwilling to take.

Split Incentives between Building Owners and Tenants

Whether a building is master or individually metered, there are quite disparate motivations to cut utility usage. Owners are reluctant to invest in energy efficiency when their bill-paying tenants reap most of the dividends; tenants lack motivation when the owners are responsible for utility bills. The issues are more straightforward in residential buildings, whose lease structures are



more uniform. In commercial buildings, especially office buildings, the barriers are more difficult to navigate due to the frequent mismatches of metering to tenancy and to the varied lease structures.

For commercial buildings, especially office buildings, the split incentive problem is exacerbated for reasons of lack of transparency, variable bases for allocation of utility expense, imprecise measurements of individual tenant usage, and vastly differing incentives to cut utility costs between tenants and building owners. There are net leases, where tenants pay their own electricity costs (only in small buildings can space conditioning be submetered), and a pro-rata share of common usage. In gross leases, the owner pays utility bills, and passes on most or all of the utility costs, usually allocated on a square foot basis as part of a common area maintenance charge. Net leases do generally result in lower overall energy costs, because tenants are responsible for usage that can be metered in their own space and their actions to reduce usage is rewarded.

Many net leases are complicated by the manner in which energy costs are allocated: in many office buildings, tenant occupancy parameters no longer conform to the electric submetering configuration as tenancy turns over. In these cases the landlord bills on a square foot basis for the entirety of the building's occupied space. Such a formula may be patently disadvantageous to tenants with shorter hours, fewer machines, and/or fewer employees per occupied square foot area. There is no motivation to invest in energy efficiency in this circumstance.

Yet net leases with transparent energy costs rarely motivate tenants to invest in new equipment, even among those with long leases. The major deterrent is the fact that utility costs represent generally less than one percent of a firm's cost of doing business in their space—the major cost is personnel salaries and overhead. Alternatively, utility costs represent on average 16% (BOMA, 2005) of an office building's operating expenses, and there is major incentive for property owners to reduce their own operating expenses, because their net operating income (NOI) and building value can dramatically increase with a significant reduction in utility expenses. Indeed, capitalizing the value of cost-effective energy efficiency retrofits could cause an immediate rise in building value by as much as \$5 per square foot (Whitson, Environmental Design, 2006).

For property owners, that incentive can be compromised in net leases by the manner in which utility costs are assessed for common areas. In some leases, the common area maintenance cost provision for utilities passes on any cost savings to the tenants; in others, the assessment is expressed in dollars/ft², with an annual rate escalator. For the latter case, the owner may be motivated, but an assessment greater than the actual cost may dampen that stimulus. Tenants with such a provision may lack the incentive to find out what the actual cost is. In short, gross leases which limit tenant recapture of energy savings provide the greatest motivation to building owners to invest in efficiency because they pay all utility bills, but fewer than 40% of leases are gross, and fewer yet have common area maintenance cost-sharing that rewards the energy



efficiency investment. In recent years, an emerging industry of offering “green leases” has emerged to distribute the risks and rewards of EE investments equitably among owners and lessees. A very complicated undertaking, its demonstration in cities such as San Francisco and New York should precede its serious application for SE cities, including Atlanta.

Lack of Information and Lack of Trust in Contractors

Frequently cited as a market barrier in health care and other industries, the challenges posed by energy efficiency associated with buyer knowledge of what to do and where to go to receive disinterested, expert advice are formidable. Energy efficiency is a diffuse term to describe many end uses, technologies, and even behaviors. It is complicated, requiring not only knowledge of what equipment is appropriate, but what engineering designers and installers are expert. It involves several different kinds of equipment and technologies, rendering difficult the mastery of all relevant categories by a single professional, even one with energy training. It spans electricity, gas, oil, steam, and water each with their own characteristics to master. Energy efficiency also features frequent introductions of new technologies and strategies.

Energy efficiency is also complicated by the variety of interactive effects that influence usage. Brand new high efficiency heating systems will not realize manufacturer’s promises if these systems are not properly sized, and if ventilation systems and controls are not properly installed and adjusted; envelope measures may also be deficient. And most of all, maintenance staff and occupants can reinforce or undermine the energy performance of buildings. Many a recently installed energy management system is defeated by insufficient training and improper operation by facility managers.

There are two additional obstacles confronting building owners: the first is a widely respected source of expertise. In almost all cities, investor-owned utilities are not well liked or respected as credible advisors, in part because they are primarily in the business of selling the very fuel an owner is trying to use less of.

The second additional challenge is the scarcity of case studies, documentary evidence, proof of what works, particularly for large buildings. There is an astounding absence of credible, long term data on the relationship between specific energy efficiency investments and building usage. At best this is a difficult undertaking for building owners, facility managers and their consultants to complete because so many factors affect these investments: changes in weather, building function, occupancy, metering configurations, the introduction of new energy-using equipment, and the expertise of the building maintenance staff. And to be credible, a case study of energy investment and savings must be associated with a particular market subsector; restaurant, small or large office building, warehouse, recreational facility, etc.

Energy performance contractors guarantee savings for the life of ten-twenty year contracts and must verify the savings over that period. Energy performance contracts typically serve



municipal buildings, schools, universities and hospitals. In the commercial office building sector energy performance contracts (EPCs) are relatively rare. Two factors largely explain the modest legacy of EPCs in the commercial subsectors: (1) the sophistication of large building owners, and their reliance on contracted engineering firms and HVAC contractors for advice; and (2) the complexity of the decision-making structures, which increases significantly the transaction costs for performance contractor. Among office buildings, energy performance contracts are even rarer, in part due to the reasons above, and also due to the short time horizons of most building owners, cited earlier.

Characterizing the Market and Profiling the Market Subsectors

For commercial buildings, distinctions by major subsector are important to discover—office buildings, government buildings, warehouses, restaurants, retail stores, religious buildings, etc. In most cities, this breakout is difficult to get, so estimates must be made from national and state census data, utility forecasts, and other data. State commerce and economic development agencies are good sources of data for commercial market subsectors. These distinctions are important for both market strategy and incentive-structuring purposes.

In designing commercial programs, there are two important distinctions—building size and ownership. Utilities typically label “small” commercial as 100 kW maximum or 25,000 kWh in monthly usage. “Large” commercial is anything larger. Owners or holders of long term leases are the targets for HVAC, envelope, controls and other high cost, long payback measures. Shorter term renters are typically candidates for lighting and other quick payback measures. understand some key differences underlying the various building market subsectors as they affect the motivations and capabilities to undertake energy efficiency investments. . Building size and ownership are the two major distinctions of note in this realm. Large buildings (50,000 square feet or more) comprise more than two-thirds of building energy use in North American and most European countries. Large residential (multifamily) and commercial buildings present challenges and opportunities that warrant customized responses from program design and marketing professionals. Ownership is the first complication: buildings with a single owner and with occupants working for the owner’s firm or organization are the easiest to serve because the split incentive problem does not exist. Unfortunately, most large buildings have many tenants and complex ownerships. So designing energy efficiency programs that benefit both tenants and owners is a requirement for successful retrofits. So too understanding that the vast majority of owners require quick 2-3 year paybacks and require many months of property manager and owner deliberations is essential. On the other hand, large buildings can attract large investments, more readily available financing and sophisticated energy engineering and design/build contractors to serve them. The marketing strategy focuses on a few key decisionmakers, extending from the CEO and CFO to the key property manager.



Small commercial buildings—typically retail stores and strip malls—also vary by ownership and tenancy. The owner-occupied and tenants with long term leases are the best candidates for significant investments. Small buildings are more difficult to reach, requiring mass marketing techniques, and have less knowledge about what to do, who can do it, and who can advise them. The myriad technologies invite multiple contractors for comprehensive retrofits, rendering the “hassle factor” a more difficult barrier than it is for larger, more sophisticated building owners. And the absence of available cash or financing options handicaps the small building owner to a greater degree than that facing the large building owner.

Effective State and Local Policies

The preceding sections describe the nature of the challenges facing the emergence of a marketplace for energy efficiency in commercial buildings. That evolution cannot take place overnight, requiring our patience, a strategy and the passage of time. It entails a roadmap, moving backward from the passage of mandatory building standards:

An aggressive and intelligent path might follow a trajectory as follows, working from 2020 backwards to the present:

- Building benchmarking, labelling and disclosure, moving from voluntary to mandatory;
- Incentive programs characterized by one-stop contracting, on-bill and property assessed financing, utility incentives based on savings performance, documented savings, strong quality assurance measures, delivered by competent organizations with a singular focus;
- Unprecedented marketing, featuring innovative social marketing efforts;
- Workforce Training investments;
- Appropriate timing for each of these developments

To achieve even these shorter term results requires the intervention of state and local policies to create the platform for successful energy efficiency programs. Below is a compendium of such policies for consideration by elected officials and government decision-makers over the next few years:

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State Policies

There are four categories of state legislation and regulatory policy that can best advance energy efficiency, including commercial and multifamily buildings:

1. Adequate funding for utility incentives to energy efficiency
2. Accessible, affordable financing programs
3. Building and appliance codes and standards
4. Tax credits and deductions

All four of these are worthy of attention from advocates and implementers of energy efficiency.

1. **Utility Incentives.** Energy Efficiency Portfolio Standards (EEPS) is one label given to legislative mandates to utilities and their regulators prescribing minimum efficiency gains over proscribed periods as a function of overall electric supply. Often those standards are accompanied by minimum ratepayer set aside contributions to energy efficiency programs, escalating over time. An EEPS of 20% achieved by 2020 or 2025 is typical; a ratepayer contribution to EE programs reaching 2% of utility revenues by 2014 or 2015 would be desirable. By contrast today, energy efficiency represents 3-5% of electric “generation”; and most SE utilities have ratepayer contributions of less than one-tenth of 1% of revenues.
2. **Accessible, Affordable Financing Incentives.** The state can order on-bill financing by its utilities; it can also enable commercial PACE programs to thrive, allowing property tax assessments to incorporate debt for energy efficiency measures. Both of these will make commercial programs more attractive and enjoy higher penetration rates. The on bill financing option has the additional advantage of serving renters; and the disadvantage of being capped generally at 5-7 years, rather than the 20-25 years offered by PACE. PACE permits more comprehensive, costly retrofits and preserves the prospect that debt service costs are retired by utility savings.
3. **Building and appliance codes and standards.** California sets the gold standard for states in securing aggressive efficiency standards for new construction, appliances, lighting, and HVAC equipment. For building codes, enforcement and local inspector training deserve emphasis.
4. **Tax credits and deductions.** States vary significantly in their tax treatment for energy efficiency in the commercial sector. Piggybacking on to federal credits and deductions is a good place to start. For more information on federal standards, see Reznick (I will attach)



Local Policies

There are a number of ways city councils and local elected officials can inspire energy efficiency investments in commercial and residential buildings. Here are some of them:

1. Property tax abatements for both new and existing buildings, based on EE, such as LEEDs Silver or better
2. Fee waivers, and accelerated permitting for zoning and construction permits associated with capital improvements
3. Dedicated funding to EE programming, such as designating a parking fee increase to the local EE program
4. Financing programs: Tie Business Economic Development low interest loan fund extant in many communities to requirement for energy audit and implementation of all five year payback ECMs
5. Mandatory benchmarking for all city buildings
6. ICLEI Committee formation (or Sustainable Community Board), setting community-wide climate change goals, and strategic 5 year plan to Energy reductions, featuring top civic, corporate leaders in the town
7. Formation of Corporate EE Voluntary Board to consider Green Leases, voluntary benchmarking, competitions for EE reductions, and subcommittees established for each market subsector
8. Create Energy Manager in local Government, as well as Sustainability Manager

The key to formulation and passage of measures such as these is the organization of a strong stakeholder group representing the major civic, environmental, public and corporate interests in a community to consider and advocate for policies such as these. It is the creation of such stakeholder groups that animates our current endeavor, funded by the U.S. Department of Energy.

