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Energy Efficiency Financing Barriers and Opportunities

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1. Introduction

Energy efficiency represents a significant largely untapped opportunity for meeting the dual goals of financial return and environmental protection. By eliminating wasted energy, the U.S. can reduce its fossil fuel use, move toward energy independence, and reduce its greenhouse gas (GHG) emissions by almost forty percent by 2030 at a net savings to customers.[1] The investor stands to harvest an estimated $130 billion in annual energy savings according to 2009 research from McKinsey & Company.[2] However, a host of barriers stand in the way of these cost savings and associated GHG emissions reductions being realized, including but not limited to:

- High upfront capital costs,
- High development costs,
- Long payback periods,
- Uncertainty of savings and perceptions of risk,
- Split incentives, and
- Limited capital availability.

How real are these barriers? What progress has been made in developing business models that resolve them? Which are the key market failures that need to be addressed to motivate investors to be first movers in this marketplace? These are some of the questions that Environmental Defense Fund (EDF) and the Nicholas Institute for Environmental Policy Solutions (NI) set out to answer through delving into the literature on the space; collecting information from EDF partner companies; and interviewing a dozen investors, who have been actively conducting due diligence on energy efficiency deals.

This paper briefly characterizes energy efficiency market sectors; describes the major players in the energy efficiency financing market; describes the key barriers facing each market sector; reviews primary internal and external financing strategies used by each market sector; summarizes our investor discussions; and offers conclusions and recommendations for catalyzing large-scale deployment of capital to the energy efficiency sector.

2. Energy Efficiency Market Sectors

The market for energy efficiency is generally broken into four sectors that group together buildings of similar size, function, and operating characteristics – (i) residential; (ii) municipalities, universities, schools, and hospitals (MUSH), (iii) commercial properties, and (iv) industrial facilities. Some barriers to financing and investment are common to all of these sectors, while others are unique to a particular sector. In this paper, we focus only on the barriers and financing models relevant to MUSH, commercial properties, and industrial facilities.

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[1] "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" McKinsey & Company, December 2007.
[2] "Unlocking Energy Efficiency in the U.S. Economy," McKinsey & Company, July 2009.

3. Energy Efficiency Market Players

A diverse set of players serve the energy efficiency marketplace, primarily in the provision of technical and engineering services. Financial institutions have begun to play a growing role in facilitating energy efficiency investment, though the bulk of their activity continues to revolve around the provision of capital leases to the MUSH market. Both public and private institutions seeking to implement new energy efficiency strategies and/or pursue funding for major energy efficiency investments will benefit from a clear understanding of who these market players are, how they operate, and what functions they provide to different sectors.

• **Energy service companies (ESCOs)** are large commercial energy service firms that provide a wide range of integrated technical solutions for institutions seeking to improve their energy performance. Examples of ESCOs include Johnson Controls, Siemens, and Honeywell Building Solutions, among others. ESCOs offer streamlined approaches to their clients—providing initial energy audits, developing comprehensive sets of recommended upgrades, engineering agreed upon solutions, constructing and implementing the improvements, and finally measuring and verifying the energy and cost-savings created over time. ESCOs are sometimes affiliated with a certain type of equipment or utility service region, but can also be both product and geographically neutral.

Central to the agreement between the client institution and the ESCO is the "energy performance contract" (EPC), in which the ESCO guarantees the institution a certain level of annual savings that will eventually pay back the initial capital investment in equipment or other infrastructure upgrades. This initial investment is usually either self-funded by the client, paid for through a capital lease from a financial institution (typically arranged by the ESCO for the client), or paid for through a mixture of self-funding and a capital lease. While the ESCO's guarantee on energy savings will usually make up any shortfalls in predicted savings, the client institution generally structures its agreements to ensure sufficient reserve capital to protect itself from defaulting on a capital lease arranged with an outside financial institution.

A large majority (greater than 80%) of the projects implemented by ESCOs occur in the MUSH market. This is because of the lower transaction costs stemming from larger deal size (typically greater than $5 million) and more standardized procurement procedures MUSH institutions have used for decades compared to companies occupying commercial properties and/or industrial facilities.[3] The barriers preventing greater penetration of the commercial property and industrial facility market sectors by ESCOs are outlined in more detail in the next section on barriers to energy efficiency financing.

• **Energy service providers (ESPs)** differ considerably from ESCOs in both size and function. ESPs are generally small or medium sized commercial firms and typically structure their technology offerings around a particular type of energy efficiency measure, such as lighting or HVAC upgrades. For this reason, client institutions usually work with ESPs on individual projects or else through a subcontractor relationship with an ESCO intermediary which provides

[3] "New Business Models for Energy Efficiency," CalCEF Innovations, March 2009.

a more comprehensive set of upgrades. ESPs generally do not enter into energy performance contracts with their clients, in part due to the more targeted nature of their offerings as well as due to their smaller size and reduced capacity to take on financial risk compared to ESCOs. ESPs have tended to favor the MUSH market for the same reasons as ESCOs have, though they have also begun to expand into the commercial property and industrial facility market sectors—especially in the provision of commercial lighting upgrades which deliver some of the quickest returns for companies focused on investing in projects with relatively short paybacks.

• **Financial institutions** have traditionally played a fairly limited set of roles in the energy efficiency marketplace, largely confined to supplying capital leases to ESCOs in service of the MUSH market, since financial firms do not themselves have the technical capacity to implement or monitor projects and results. Capital leases have been the preferred vehicle for this type of investment since they carry substantially less risk than other types of equity or debt-based investment should the client's energy efficiency projects not deliver predicted cost-savings.

Encouraging greater participation by financial institutions and other types of investors in the energy efficiency marketplace will be of primary importance in capturing the huge amounts of unrealized energy and cost-savings in today's built environment. In the following sections we will first outline the barriers currently facing investor participation in the energy efficiency marketplace and then discuss some innovative approaches to overcoming these barriers.

4. Barriers to Energy Efficiency Financing

A number of factors continue to prevent the widespread investment in energy efficiency capable of capturing the billions in potential cost-savings up for grabs in public and private buildings. Some of these "barriers" to energy efficiency financing are common to the MUSH, commercial property, and industrial facility market sectors, while others are unique to only one or two of these groups at a time. Below is an overview of the key barriers we have identified from our research and discussions with various financial institutions and investors.

a. Universal Barriers

The following set of barriers to energy efficiency financing is common to the MUSH, commercial property, and industrial facility market sectors:

• **High upfront capital costs:** Energy efficient equipment (e.g. lighting, HVAC, etc.) is generally more expensive then less efficient counterparts, regardless of market sector or building type. Additionally, the cost to retrofit major building systems, upgrade a building's envelope, or install more efficient industrial machinery can represent a substantial upfront investment. This cost can be difficult to justify for institutions and outside investors alike, despite the cheaper overall lifecycle costs of such improvements. With procurement departments of most public and private institutions focused on minimizing upfront costs, all too often these types of large-scale investments are avoided unless deemed absolutely necessary by the institution's leadership.

• **Uncertainty of savings and perceptions of risk:** In order for an outside investor to justify financing a company's initial energy efficiency capital investment, he or she requires a considerable degree of confidence that the resulting energy cost-savings will occur and deliver a reasonable return. While energy cost-savings are quite reliable for many energy efficiency investments, few players or mechanisms currently exist to measure and verify these savings—making it difficult and costly to collect and track the quantitative evidence required by investors. Until this data is more widely available, investors will continue to regard energy efficiency as inherently risky—preventing a broad expansion of this asset class.

• **Budgets do not prioritize energy efficiency:** Maximizing energy efficiency is not generally part of the core mission statement of an institution—regardless of whether it is a university that prioritizes research excellence, a hospital that emphasizes patient health, or a manufacturing company that focuses on product sales. As a result, energy efficiency investments are often pushed to the side when drafting annual budgets (internal financing) or pursuing outside investor interest (external financing) in favor of other investments that are deemed more essential to the institution's core business activities and operations, such as improving customer satisfaction, gaining market share, or expanding production. Due to these practices, individuals within many institutions face significant challenges accessing the necessary capital to pursue energy efficiency improvements—from initiating pilots that demonstrate small-scale "wins" and create buy-in to implementing full-scale retrofits or other integrated energy management solutions capable of capturing much larger savings.

• **Lack of secondary markets:** Especially for deals that have longer time frames for returns, the current illiquidity of these investments is a deterrent for investors compared to established markets where earlier exits are easier.

b. Municipalities, Universities, Schools, and Hospitals (MUSH) Barriers

As described previously, MUSH market institutions tend to possess more highly standardized procurement procedures and deal in larger transaction sizes compared to those of other market sectors, which provides the streamlined project identification and aggregation preferred by ESCOs. Also, government-funded contracts are seen as highly profitable and reliable by ESCOs, making these types of projects desirable. Compared to commercial properties or industrial facilities, MUSH institutions frequently benefit from a greater capacity to self-finance, or attain capital leases from financial institutions thanks to their track record working with ESCOs. Even with these advantages, however, EDF has learned from its Climate Corps Public Sector[4] program that institutions in the MUSH market face the following unique barriers:

[4] EDF Climate Corps Public Sector is a program that embeds trained graduate students in colleges and universities, houses of worship and state and local governments to identify cost-effective energy efficiency improvements. http://www.edf.org/page.cfm?tagID=60252

• **Policies that fail to incentivize investments:** Public universities and municipalities in many states face a paradox: government policies fail to incentivize investments in improved energy performance. In many states, if a public institution implements an energy performance upgrade that saves a certain amount of money in energy costs per year, the next year the state government may reduce that institution's annual budget by an amount equal to these cost-savings—effectively penalizing the institution for its effort and failing to incentivize additional investments.

• **Limited capacity and staff resources to pursue energy efficiency:** Compared to profit-oriented commercial enterprises, public institutions often possess less capacity and fewer staff resources to dedicate to uncovering operational efficiency improvements. With fewer dedicated resources in place, public institutions frequently overlook the lowest-hanging fruit investment opportunities and fail to effectively lobby their state governments to implement policies that appropriately support their energy performance strategies.

c. Commercial Property and Industrial Facility Barriers

Certain barriers to energy efficiency financing are applicable to both companies occupying commercial properties or industrial facilities, but are less directly applicable to the institutions constituting the MUSH market:

• **High development costs:** Compared to institutions in the MUSH market, identification and aggregation of energy efficiency projects in commercial properties and industrial facilities has proven generally more difficult for ESCOs and outside investors. Without a ready pipeline of appropriately vetted projects available at sufficient scale, potential investors would be required to deal with smaller transaction sizes and therefore more costly due diligence in order to ensure a reasonable risk profile—leading to higher overall development costs (e.g. paying for the initial energy audits, establishing measurement and verification (M&V) protocols, etc.). Essentially, no one has wanted to be the "first mover" responsible for fronting the costs to get a major set of energy efficiency projects underway in these market sectors.

• **Long payback periods vs. corporate focus on short-term profits:** Though cost-savings from energy efficiency upgrades are frequently large, stable, and predictable, they do often require significant initial capital investments that can take a number of years to pay off before becoming profitable, causing these projects to have relatively long payback periods compared to some other types of revenue-generating investments. Further, many large publicly-traded companies impose short payback requirements on their various investments in order to encourage short-term profits—meaning that energy efficiency projects with even very high net present values (NPVs) are frequently overlooked in favor of other investments with quicker returns but lower long-term earnings potential. Focusing exclusively on simple payback as the metric of financial success for investments can cause companies to ignore numerous highly profitable cost-savings opportunities.

This issue is particularly pronounced for industrial firms where equipment is highly specialized and expensive as well as real estate portfolio managers in charge of large numbers of commercial buildings. Industrial firms have a short-term horizon for investments and typically require rapid positive returns on their investments. In fact, a recent Johnson Controls survey demonstrated that approximately half of interviewed industrial executives and managers require energy efficiency projects to have payback periods of less than three years.[5] According to others familiar with the corporate real estate industry, many real estate portfolio managers have maintained even stricter requirements of 18 months or less for project paybacks, especially as recessionary caution has limited capital investments overall.[6]

• **Mortgage lender limitations on external financing:** Most mortgage lenders prohibit commercial and industrial building owners from taking on additional debt or accepting liens on equipment and systems because those systems are considered part of the assets securing the original mortgage note.[7] Thus, from a legal perspective no other claimants are allowed to take a security interest in the assets that fall under the mortgage. It is for this reason that many companies express a desire for "off-balance" sheet solutions.

• **Limited external financing products available:** In today's market there are few providers of financial products designed to serve the energy efficiency needs of large commercial customers and industrial end-users. This is because energy efficiency finance has primarily relied on ESCO performance contracting to lower risk and ensure predictable returns. Yet, for all of its success in public and not-for-profit entities, performance contracting has remained largely absent from the private sector due to ESCOs' inability to adapt their practices to meet the mortgage requirements, longer project development cycles, and personalized needs of private sector clients in commercial properties and industrial facilities.[8] New models capable of adapting the performance contracting model to the commercial and industrial market sectors will be essential to capturing this vast economic opportunity.

d. Commercial Property Barriers

In addition to those barriers already mentioned, lease agreements can create a secondary set of challenges for companies occupying leased commercial properties due to the issue of "split incentives" that arise between a building's landlord and its tenant:

• **Split incentives:** Split incentives arise when a lease agreement makes a landlord responsible for paying to upgrade a building's energy performance while the tenant is responsible for paying the monthly energy bill. This is the way leases are structured for a huge proportion of U.S. commercial property square footage. In this arrangement, the landlord is not incentivized to pay to upgrade the building's energy efficiency since doing so would require a large capital investment on his or her part without the opportunity to regain cost-savings through reductions

[5] "Energy Efficiency Indicator – North America," Johnson Controls, 2010.
[6] "Real Estate Portfolio Managers Find Millions of Reasons to Go Green," GreenBiz.com, May 2011.
[7] "Managed Energy Services Agreement – A New Way to Fund Energy-Efficiency Projects," Steve Gossett, Jr., February 2010.
[8] "New Business Models for Energy Efficiency," CalCEF Innovations, March 2009.

to the monthly energy bill. The tenant is similarly not incentivized to put resources into improving the building's energy performance since he or she does not own the building and will not benefit from the added property value he or she created by the investment when the building is eventually sold. The result is a catch-22 where neither party is incentivized to act—meaning that the building's energy performance remains inefficient.

e. Industrial Facility Barriers

Finally, industrial facilities face the unique challenge of operational interruption.

• **Operational interruption:** Retrofitting or replacing inefficient equipment generally requires a company to shut-down part of its operations temporarily. While this may not impose significant interruptions for companies located in office buildings that are unoccupied for many hours each week, factories and other industrial facilities with on-going operations can be negatively impacted by shutting down for the multiple days that a significant upgrade may require. Since industrial facilities place particular emphasis on optimizing manufacturing processes and ensuring continuous operation of plants to maximize profits, implementation of energy efficiency upgrades that take the plant out of service are generally discouraged. Industrial companies will factor in losses of productivity in any decision to invest in more efficient equipment or systems—putting these investments at a disadvantage compared to other market sectors.

In summary, barriers to ready financing of energy efficiency investments exist in every market sector under consideration. However, if the significant capital expenditures necessary to realize the cost-savings estimated by McKinsey & Company are to ever be realized, new strategies for deploying institutional capital and connecting outside investors with those institutions need to be envisioned and implemented.

5. Financing Strategies for Energy Efficiency

Despite the numerous barriers facing institutions seeking to finance energy efficiency improvements, several strategies have been successfully employed by players in the MUSH, commercial property, and industrial facility markets to fund investments with both strong environmental and economic returns. These approaches broadly fall within two categories: internal and external financing strategies.

a. Internal Financing Strategies

Internal financing strategies are those that leverage an institution's existing financial resources. Self-financing can bypass the need to attract third-party capital and is an option for organizations with sufficient budgetary flexibility to recoup cost-savings over a number of years. By doing this, institutions are able to avoid taking on debt, paying interest, and dedicating staff time and resources to secure external financing. Additionally, internal financing allows an institution to minimize its "cost of waiting"—the savings the institution forgoes earning if it must wait to attract external funding.

MUSH Institutions

In the MUSH market sector, ESCOs have for many years offered performance contracts to governments, municipalities, schools and universities, healthcare organizations and other groups in order to implement major energy efficiency retrofits. The idea behind performance contracting is straightforward—aging equipment and systems are replaced with modern, energy- and resource-efficient technologies, and less-than-optimal operations and maintenance procedures are overhauled with new programs based on industry best practices. The capital investment to make the improvements is reimbursed through the savings created over the contract period, and the ESCO that installs the improvements contractually guarantees a combination of savings on energy consumption and improved system performance, or both.

One of the primary reasons ESCOs have been so eager to engage with this sector has been the capability and willingness of customers to self-finance the capital investments without the ESCOs needing to risk their own funds.[9] Institutions in the MUSH market can frequently draw on their endowments, capital budgets, or operating budgets to pay for such capital investments or even tap funds for deferred maintenance or additional reserve accounts slated for energy efficiency projects. In so doing, the institution essentially takes equity ownership in the project—ownership that may be either complete or partial and supplemented by an additional external financing strategy such as a capital lease or debt mechanism provided by a financial institution familiar with ESCO contracting in the MUSH market.

An alternative self-financing approach used in the MUSH market is the green revolving fund (GRF). In this model, the institution earmarks a specific sum of money for a capital pool that is lent out to different groups and/or building occupants applying for energy efficiency project funding. As the projects begin to recover operational cost-savings, those resources return to the capital pool and can be redeployed to fund new projects.

The use of capital funding pools specifically earmarked for energy performance improvements has been growing rapidly among U.S. colleges and universities in recent years. In the Sustainable Endowments Institute's 2011 Greening the Bottom Line survey of higher education institutions, 52 public and private schools were identified that together are investing about $66 million through dedicated capital pools, about half in non-revolving and half in revolving funds.[10] Over 70% of these schools started their funds in the years spanning 2008 to 2011.

Capital pools range dramatically in size, from $5,000 at the College of Wooster to $25 million at Stanford University, with an average size of $1.4 million and a median size of $170,000. Schools may choose to finance the initial capital pool through a variety of sources, including central administrative and departmental budgets, student fees, pre-existing efficiency savings and

[9] "New Business Models for Energy Efficiency," CalCEF Innovations, March 2009.
[10] "Greening the Bottom Line," Sustainable Endowment Institute, 2011.

utility rebates, alumni donations, and/or endowment funds. From the wide variety of schools currently using such funds, it is clear that lack of institutional wealth should not prevent an institution from considering this strategy. Annual returns range from 29% at Iowa State University to 47% at Western Michigan University, with a median annual ROI of 32%. This performance demonstrates that GRFs can significantly outperform typical endowment investment returns, while sustaining high returns over longer periods of time.

With over $300 billion in combined endowment assets, U.S. colleges and universities (as well as other MUSH institutions) could consider establishing similar types of revolving loan funds with the resources available to them. In order to catalyze this flow of capital, the Sustainable Endowments Institute (SEI) in collaboration with 12 partner organizations recently launched the Billion Dollar Green Challenge, an initiative which seeks to encourage colleges and universities to invest a combined total of $1 billion over the next two years in self-managed revolving loans that finance energy efficiency improvements.[11]

Commercial Properties and Industrial Facilities

Companies occupying commercial properties or industrial facilities have also found ways to deploy internal funds in a strategic way that maximizes energy performance while delivering significant financial value to the company, even without the benefit of ESCO performance contracts.

From EDF's experience running its Climate Corps[12] program, we have identified a number of methods that companies can use to avoid the financial pitfalls imposed by barriers to energy efficiency like high upfront costs, long payback periods, limited capital availability, and perceived risk by modifying the way they fund and evaluate their investments. Pioneering companies choose to dedicate specific funding to energy efficiency, broaden their investment evaluation criteria, alter their evaluation method, and/or substitute the financial variables they emphasize in order to reveal and quantify the underlying value associated with such investments.

For example, rather than imposing a strict financial requirement like a maximum payback period on all energy efficiency investments regardless of long-term savings potential, some companies instead evaluate their investments using both the simple payback method and the net present value (NPV) method, resulting in a more reasoned choice between projects with only modest NPVs but short payback periods and projects with very significant NPVs despite somewhat longer payback periods. By utilizing both payback and NPV to analyze the investment, these companies have capitalized on the opportunity to diversify the characteristics of their investments by being able to moderate when to maximize short-term profits versus long-term value creation.

[11] Greenbillion.org
[12] EDF Climate Corps is a program begun in 2008 that matches trained students from leading business schools with companies to develop practical, actionable energy efficiency plans. http://edfclimatecorps.org/

Numerous other companies, including Climate Corps host companies Cummins and AT&T, have set specific spending goals and internal funding pools dedicated to expanding investments in energy efficiency each year that have created annual savings in the millions of dollars. United Technologies Company (UTC) and Johnson & Johnson have been two leaders in this area. In 2010, UTC set an internal goal in 2010 to spend $100 million on energy efficiency projects. With the company's energy team helping business units access these funds by the end of 2009 the company had identified over 1,200 projects, valued at over $170 million in implementation costs.[13] Despite potential capital constraints due to changing economic conditions, UTC chose to fund 788 of these projects at a total value of $116 million, exceeding its 2010 goal early. Further, while the projects selected had an average payback of 2.5 years, projects with paybacks as high as five years were also approved when other factors such as greenhouse gas reductions and energy price volatility were taken into consideration. Johnson & Johnson has similarly pioneered enlightened internal funding approaches, even going so far as establishing a carbon dioxide reduction capital funding process that provides $40 million per year in revolving funds for energy and greenhouse gas reduction projects across the company's global operations.[14]

Perhaps one of the most innovative approaches to internal financing has been demonstrated by Diversey, a Climate Corps host company, which has developed a portfolio approach for selecting energy efficiency projects that allows it to diversify and maximize the returns of its investments. In 2008, the company joined Climate Savers and established goals to reduce its greenhouse gas emissions by 8% below 2003 levels by 2013. It simultaneously set out to achieve a positive ROI across the investments deployed to facilitate this reduction. The company realized that it needed to balance different types of investments in order to meet the targets set by each of its goals.

For example, the company identified certain "avoidance" projects that required little to no capital investment and created near-term financial returns but did not maximize GHG emission reductions. On the other end of the spectrum, some advanced energy performance projects did not meet the company's normal ROI expectations but would create huge reductions in emissions. In order to incorporate both "values" into its evaluation methodology, Diversey developed a model that balanced multiple variables at a time—the timeframe of financial return (simple payback), the volume of financial return (NPV), and the cost of the carbon investment ($/MT avoided carbon) across an entire portfolio of potential projects. The results of the upfront modeling were incorporated into a project database that allowed for prioritization of various projects according to different criteria, allowing the company to selectively build a portfolio much like an investment manager might build a mutual fund.[15] This more balanced evaluation approach resulted in increased carbon emissions reductions, from 8% to 25%; reduced capital investments, from $19 million to $14 million; and tripled cash savings—all by modifying its evaluation approach to include additional criteria and variables. Further, the approach overcame the barriers facing any single energy efficiency project from being implemented, whether due to higher than average upfront costs or somewhat longer payback periods than

[13] "From Shop Floor to Top Floor: Best Practices in Energy Efficiency," Pew Center on Global Climate Change, April 2010.
[14] Johnson & Johnson. http://www.investor.jnj.com/2009sustainabilityreport/environment/climate.html#energy
[15] "Diversey's Portfolio Approach Toward Sustainability ROI," GreenBiz.com, March 2011.

other investments. Lastly, the diversification provided by the approach greatly limited the risk any single project could impose on the company reaching its simultaneous strategic goals.

The potential for expanding such innovative internal approaches to financing energy efficiency is enormous. Though detailed tracking and analysis has not yet been completed, we know anecdotally that the large majority of the projects EDF Climate Corps companies implement are financed using internal capital. Given that Climate Corps companies are highly representative of other Fortune 1000 corporations, we expect that many other companies have similar access to internal funding sources that could be unleashed if such forward-thinking approaches to financing became widespread.

b. External Financing Strategies

While internal financing strategies have significant potential to unleash new capital for energy efficiency improvements in companies, for some institutions internal financing may not be possible if there is particularly intense competition for funding from other operational needs, the opportunity cost of losing cash for other core priorities is too great, or the funds could be invested elsewhere at even better returns.[16]

For these institutions, external financing strategies may provide an ideal solution. While MUSH institutions have faced relatively little difficulty attaining external financing through lease agreements tied to ESCO performance contracts, to date capital in the commercial and industrial market sectors has not yet been deployed at scale in the marketplace.

A number of promising innovations in external financing for energy efficiency are beginning to emerge in niche markets, including green leasing structures, municipal bonds backed by property tax liens (PACE), and government-backed loan guarantees to protect against building owner default risk. Hannon Armstrong, an energy efficiency investment firm, has proposed, for example, that the U.S. Department of Energy's loan guarantee program under Title XVII be expanded and used to back a new hybrid credit model that would bring together ESCOs and lenders to identify and fund energy efficiency retrofits.[17] Alternatively, on-bill financing, where a utility finances companies' energy efficiency improvements and is repaid through a surcharge on energy bills, could represent a major game-changer if the incentives can be appropriately aligned and utilities are convinced or mandated to act.

However, these innovations continue to face considerable challenges including the need for substantial changes in government and/or utility policy and practice. On-bill financing, for example, is currently being stymied by the fact that most utilities are reluctant to perform "banking functions" that can create issues with state consumer lending laws and introduce default risk for their own capital or ratepayer funds.[18] Without some sort of substantial

[16] "Buy Now, Pay Later: New financing programs help homes and businesses become more energy-efficient without shelling out big money upfront," The Wall Street Journal, February 2011.
[17] "Tapping into a Trillion Dollar Industry: How to Increase Energy Efficiency Financing by 2015," John J. Christmas, The 5th Annual Energy Efficiency Finance Forum, May 2011.
[18] "New Business Models for Energy Efficiency," CalCEF Innovations, March 2009.

legislative action or other federal intervention, uptake among commercial property owners of these types of programs will likely remain constrained in the near to moderate term.

However, there are other models that have begun to successfully operate today within the commercial and industrial market sectors without requiring policy changes enacted by state or federal government. These models create uniquely structured agreements between investment funds, building owners, and energy service providers in order to create access to upfront capital and overcome a number of the traditional barriers to energy efficiency financing. While the models differ in specific ways, they are fundamentally similar in that they both create special purpose vehicles that shoulder the upfront costs of the efficiency equipment or systems and earn a return from the resulting energy savings.

• **Efficiency Services Agreement (ESA)**

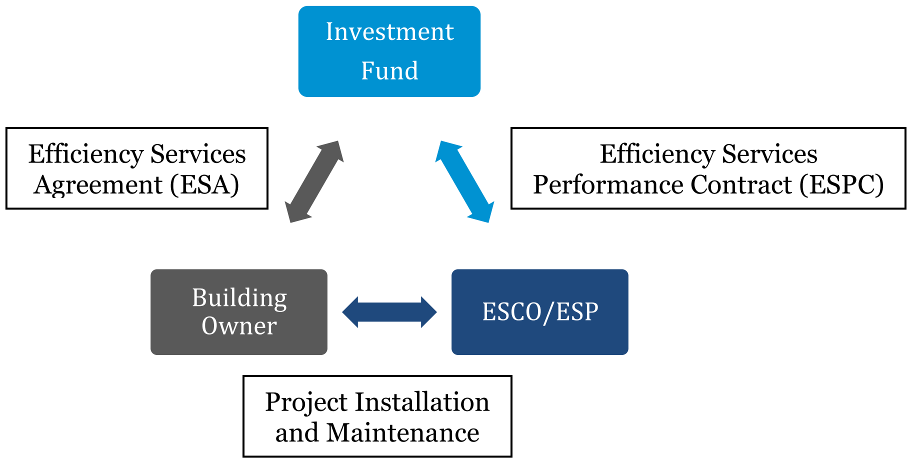
In the Efficiency Services Agreement (ESA) model, an investment fund serves as an intermediary between the building owner and the service provider who installs the energy efficiency upgrades the building requires (see Figure 1). In this role, the investment fund acts as both the financier and owner of all of the energy efficiency assets during the length of the agreement and develops two separate contracts—the ESA with the building owner and an Efficiency Services Performance Contract (ESPC) with the service provider who can be either an ESCO or ESP, depending on the type and extent of the retrofit demanded.[19]

In the ESA, the investment fund and the building owner structure a contractual agreement that makes the investment fund responsible for providing all upfront capital for the energy efficiency investments through the creation of a special purpose entity that is funded through a mixture of equity and debt provided by the fund's capital partners and other outside banks or lenders. At the same time, the building owner agrees to pay a regular service charge to the investment fund that slowly pays off the capital investment as well as provides a return to the investment fund's partners and lenders over the lifetime of the agreement. In order for this to work, the service charge is set as a cost per unit of avoided energy that is equal to the building owner's normal energy costs. This protects the building owner from ever paying more per month for energy than he or she did before entering the agreement.

At the same time, the investment fund establishes a separate ESPC agreement with the ESCO or ESP that will act as the service provider for the building upgrades. This agreement covers the engineering, procurement, and construction (EPC) scope of the work as well as defines the on-going maintenance and monitoring services that will be required after the project becomes operational to ensure, measure, and verify cost-savings. In order to mitigate risk, the investment fund works with the service provider to negotiate performance guarantees on individual projects included in the portfolio of implemented upgrades.

[19] "Energy Efficiency Paying the Way: New Financing Strategies Remove First-Cost Hurdles," CalCEF Innovations, February 2010.

FIGURE 1. EFFICIENCY SERVICES AGREEMENT (ESA)



The unique structure of the ESA model allows a number of key barriers to energy efficiency financing to be mitigated or overcome:

- **High upfront capital costs and limited capital availability:** The model allows building owners to avoid all upfront capital outlays by charging for energy value realized versus equipment costs. The investment fund owns the installed equipment throughout the length of the contract but provides the opportunity for the building owner to buy the equipment at or below market price at the end of the contract.

- **High development costs:** The model uses a standardized contractual structure to aggregate multiple energy efficiency projects into a single portfolio that is funded through a mixture of equity and debt. This aggregation creates a pipeline for replicating projects across an entire portfolio of facilities, making it easier and cheaper for outside investors to go after these projects than if they tried to identify individual projects on their own.

- **Mortgage lender limitations on external financing:** The model represents an "off-balance sheet" solution; it does not require the company to take on any additional debt or accept liens on equipment and systems, allowing the building owner to avoid the legal challenges imposed by existing mortgages.

Metrus Energy and Green Campus Partners (GCP), companies that serve large industrial and commercial facilities as well as institutions in the traditional MUSH market, are two of the more prominent firms that are using this structure. GCP has also pioneered an approach for bundling efficiency projects into loans for resale—an innovation that could help prompt the development of secondary markets for energy efficiency assets.

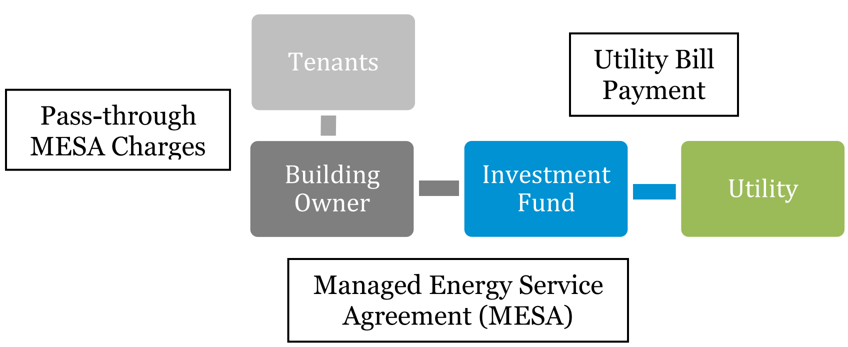
• Managed Energy Service Agreement (MESA)

There are numerous similarities in structure and function between a Managed Energy Services Agreement (MESA) and the ESA model previously described, albeit with some important differences. Once again an investment fund acts as both the financier and owner of all energy efficiency assets during the length of a contractual agreement with a building owner and assumes full responsibility for all upfront costs through a special purpose entity funded by a mixture of equity and debt provided by the investment fund's capital partners and lenders.

However, instead of charging the building owner a service charge that scales with energy savings, the investment fund instead assumes the role of paying the building owner's on-going utility bill directly and charges the building owner a fixed monthly fee equal to the building's historical energy rates adjusted for key occupancy and weather-related variables that are agreed upon prior to finalizing the agreement.[20] In this way, the investment fund becomes an intermediary between the building owner and the local utility and generates revenue by capturing the differential between the building's old energy costs and its decreasing energy costs as the building is made more efficient over time. Despite this different payment structure, the end financial result is essentially the same as for the ESA model.

The investment fund once again coordinates with various service providers to implement projects for the building owner, although Transcend Equity Development Corporation—the originator and main practitioner of the MESA model—has chosen to internalize many of the tasks an ESCO would otherwise perform, including conducting much of the engineering, design, and monitoring services. Transcend then outsources installation and construction functions to a range of ESPs and contractors with whom it creates individual performance agreements and guarantees.

FIGURE 2. MANAGED ENERGY SERVICE AGREEMENT (MESA)



[20] "Energy Efficiency Paying the Way: New Financing Strategies Remove First-Cost Hurdles," CalCEF Innovations, February 2010.

Due to its similarities with the ESA model, the MESA model addresses the same traditional barriers to energy efficiency financing, including issues with high upfront capital costs, corporate capital constraints, high development costs, and mortgage lender limitations.

However, the MESA model also has additional benefits for multi-tenant commercial building spaces. While both models enable the building owner to avoid capital outlays and thus reduce his or her reluctance to investing in improved energy performance, the MESA model goes farther. It reduces split incentives in these types of commercial properties by giving landlords the additional capability to "pass-through" MESA sub-charges to their various tenants in the form of their standard energy bills. This arrangement meshes well with standard commercial lease structures since it does not change bill-payer alignment. Additionally, since repayment is tied through the utility bill itself, the risk of tenants or a building owner failing to make payments is reduced compared to servicing debt through individual service charges. Because a utility bill "keeps the lights on," tenants have to pay this bill unless they want to sit in the dark.

By expanding the number of external financing products available to two of the most underserved energy efficiency market sectors—commercial properties and industrial facilities—the ESA and MESA models represent significant positive steps toward opening up the wider energy efficiency marketplace. However, many challenges continue to face models of this kind. Principal among these is the fact that both models remain very new and therefore have not developed long enough track records of success to convince risk averse investors that they should commit the levels of funding required to bring either strategy to scale in the wider marketplace.

6. Summary of Investor Discussions

Considering that the above described ESA and MESA models appear to address many of the key energy efficiency financing barriers, we set out to interview a range of investors to understand why capital is not flooding into the space. We interviewed a dozen investors, ranging from mission-focused players deploying an average of $250,000 to large institutional players interested in deploying as much as $250 million. Our key take-aways are below:

• **Capital is not a bottleneck:** We learned, first and foremost, that there is great interest in energy efficiency financing. All the investors we spoke to were actively investigating the space and some, such as Hudson Clean Energy Partners, had already made investments in the space in the U.S. In the case of Sustainable Development Capital (SDCL), its activity in the U.S. to date had been trumped by a larger market opportunity in China, but is now talking to about 75 institutional investors that are interested in U.S.-focused energy efficiency opportunities. Finally, among larger institutional players, there is particular frustration that among the large banks none of them is creating vehicles that could absorb a large-scale investment size.

• **Where are the projects?** The key challenge investors cited is the lack of pipeline. EKO Asset Management Partners' conclusion from its due diligence in the space is that there is not yet a clear and scalable path to a supply of energy efficiency projects. Similarly, SDCL believes that the relevant questions are (a) how can development costs be addressed, and (b) how can projects be aggregated to reach a specific, scalable level of investment? While a scalable level of investment was not specifically defined, the discussions hovered around $100 million as a potential threshold of interest. Hudson Clean Energy Partners, who in the fall of 2010 took a controlling interest in Green Campus Partners (GCP), indicated that faith in the GCP management team to develop pipeline was a key reason for investing in the company. Lastly, MissionPoint Capital Partners believes projects exist and the market for capital will be stimulated when project implementation begins to occur in earnest.

• **What other drivers could stimulate an investment market?** Through our discussions, we also learned that investors believe that existing energy efficiency project investments are achieving double-digit returns, although identifying those double-digit return projects has proven more elusive. In other words, there is an "urban myth" quality to these returns. Hence, collecting and publishing examples of projects that are achieving double-digit returns could help stimulate the market. One investor commented that capital markets will take care of the scale. In the meantime, what is needed is the creation of mechanisms to encourage efficient sourcing of deals, aggregation of data, and promotion of successful financial models. Lastly, some investors believe that federal and/or state policies requiring compliance with building code and industrial efficiency standards (energy-intensity targets), could stimulate the market for projects and needed investment capital.

Conclusions and Recommendations

From our research and discussions with investors it is clear that while capital is available and eager to be deployed, the full value chain in the energy efficiency marketplace is not yet working. The following are the areas where we believe that activity should be focused to address this market failure:

• **Project aggregation:** ESCOs have been and are active in the MUSH market sector, but there has yet to emerge a robust group of project aggregators for the commercial and industrial sectors. A strategy for attracting aggregators to the marketplace is a key for success.

• **Demand stimulation:** The flip side of sourcing and aggregating deals is developing demand for energy efficiency retrofits. EDF's Climate Corps program has demonstrated that once the opportunity for savings is revealed, capital is often readily deployed to capture the savings. Witness that 86% of Climate Corps recommendations are implemented by participating companies. Greater awareness of this value creation opportunity among owners could create the momentum needed for projects to reveal themselves, adding a "push" to the "pull" of project aggregators.

• **Data standardization and consolidation:** Investors currently do not have a high level of confidence in the projected energy savings from projects because of two factors: 1) The disparities in collecting data; and 2) the lack of sufficient reference sets to assure that savings will be realized. Moving toward building a common set of measurement methodologies and standardized data is an important step for attracting loan underwriters and investors.[21] Furthermore, centralizing data, so they are readily available for comparison with future projects, is also important for reducing perceived risk associated with energy efficiency investment opportunities.

• **Deal structuring expertise:** Because of the paucity of deals and investors' lack of familiarity with deal structures involving off-balance sheet solutions and energy efficiency data, there is a learning curve that many investors have to go through in this space. If some initial pilot deals could be made where the structuring process was shared, this could help address the learning curve issue.

• **Development of secondary markets:** The lack of liquidity in the energy efficiency financing marketplace remains a large disincentive to investors. In other words, other than completion of the time horizon of the project, there is no exit opportunity for the investor. The development of instruments and a marketplace for resale will be important to the development of this marketplace.

In addition to bridging the capital-to-project gap, through our research we identified additional research or services that could help stimulate demand for energy efficiency upgrades and the related investment opportunities. The recommendations for research were beyond the scope of this effort and may be considered for future efforts.

• Researching and documenting examples of commercial properties with energy efficiency upgrades being valued higher or selling for more compared to properties without such upgrades would be beneficial.

Recommendation: Address the value-added question in the commercial sector by conducting research to establish the connection between energy efficiency investments or upgrades and the increased value of commercial properties.

• In the tenant-owner commercial building sector, a substantial barrier to investing in energy efficiency upgrades is commercial building ownership structure. Through a series of discussions in 2010 with relevant parties, Hannon Armstrong and others outlined a potential hybrid credit model that would address this barrier. The hybrid model would include expanding DOE's loan guarantee program under Title XVII into the commercial sector to protect against default risk.

Recommendation: Advocate for a loan guarantee product in order to establish a performance history for commercial loans that would result in additional capital being brought into the market. In addition, as suggested by The Betsy and Jesse Fink Foundation, foundations could also serve a role by providing monies for a threshold level loan guarantee fund.

[21] EDF is already working to engage the engineering and financial communities in discussions about common measurement methodologies; EDF is also working to introduce investors to relevant staff at the Department of Energy and the Environmental Protection Agency who either have data or can provide access to data on a wide range of industrial energy efficiency projects.

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