Financing Energy Efficiency

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Abstract

Compelling climate, regulatory, economic and financial reasons necessitate scaling up energy efficiency (EE) - buildings in United States consumed nearly 50% of the nation's energy use, at a cost of over $400 billion last year, mostly from fossil fuels. EE is an effective climate mitigation strategy, creates jobs and costs just a third of the energy generation investment. However, implementation of EE measures remains significantly less than might be expected. This paper, in the context of U.S. buildings, examines both the compelling imperatives and barriers in scaling up EE implementation. Five key financing options are examined, analyzing the various stakeholders' interests in implementation – the building owner, the tenant/occupant, the investor and the utility. A pilot-tested financial transaction structure: Metered Energy Efficiency Transaction Structure (MEETS) promises to satisfy all stakeholders' interests – through innovative transaction structuring and the smart use of standardized energy measurement technology. Rather than availability of finance, the primary hurdles to implementation center around inadequate measurement and verification, and investor confidence.

Keywords:

Financing, Energy efficiency, Buildings, Utility, Policy, Energy measurement

1. Benefits

The benefits of energy efficiency (EE) extend far beyond saving money on utility bills. A review of independent reports establishes that the need for large-scale implementation of EE is driven by compelling climate, regulatory, economic and financial reasons including:

- Potentially $80 billion can be saved annually in U.S. from just 20 per cent reduction in energy use in buildings alone (U.S. DOE[i]);
- EE costs almost half to a third that of energy generation (ACEEE[ii]) per kilowatt hour (KwH) of savings or production;
- EE is an immediate and inexpensive way to mitigate adverse climate impacts (IPCC[iii]);
- Investments in EE boost job creation (EDF[iv]);
- Various states, including California, have adopted regulatory measures to mandate EE implementation (AB32, CA[v], Title 24, Part 6, California Energy Code[vi] in CA);

However, investment costs and lack of financing options remain key barriers in scaling up EE implementation (IPCC, Ceres[vii], PGL[viii], DOE). In turn, despite sufficient availability of investment dollars, investment in EE remains less lucrative due to investors' uncertainty of returns from inadequate objective energy consumption measurement systems as well as utilities' concerns that lower energy use reduces their revenues (PGL).

2. Benefits of Scale

Scaling up EE implementation offers financial and cost benefits. Last year, buildings in U.S. (commercial and residential) consumed nearly 50% of the nation's energy use, and 74% of electricity consumption, at a cost of over $400 billion, much of it from fossil fuels like coal and natural gas. Reducing energy use in U.S. buildings just by 20 percent would save approximately $80 billion annually on energy bills (1, 2). The EE market is often considered “low hanging fruit” compared to capital-intensive energy generation technologies - ACEEE reviewed utility-sector EE program costs in recent years (2009-2012), and estimates that electric utility EE programs are about one-half to one-third the cost of new energy generation (3, 4). A recent study also finds that despite their physical diversity and disparate stakeholders’ interests, targeted EE programs small buildings and small portfolios sector can generate an estimated $30 Billion in annual energy cost savings. The study recommendations include standardization of energy measurement, and alignment of technical solutions and financial tools (10).

EE also offers the climate mitigation advantage for the planet. A recent IPCC report finds that substantial investment in cleaner sources of energy will be needed to contain global warming, but much can be accomplished by EE - a “key mitigation strategy”. It finds that buildings accounted for nearly a third of the world's total energy use in 2010. As well, their energy demand is projected to double and CO2 emissions to increase by 50 ~150 percent by midcentury. Additionally, it identifies investment cost as a key barrier to implementing EE (5).

Implementing EE also makes economic sense, creating jobs. Between 2010 -2012, existing EE programs in California alone created an estimated 15,000 -18,000 jobs and at full-scale implementation, on-bill repayment (an electric utility driven EE measure) could create 600,000 job-years nationwide in the next 12 years (a job-year is a full-time job that lasts for one year) (6).

Finally, regulatory mandates also call for implementing EE. AB 32 mandates California to make homes 40% more energy efficient by 2020. The 2013 Residential and Non Residential Building EE Standards prescribe significant changes focusing on performance based buildings design including windows, ducts, ventilation, lights, heating, insulation and smart thermostats and mandate design teams to complete commissioning plans before a building starts (7).

Despite being a ‘low hanging fruit’, the compelling imperatives and even regulatory mandates, the potential for EE implementation remains underutilized. While availability of finance has been recognized a key hurdle (5), several specialized funds are reportedly having trouble deploying money despite the clear imperative for EE (8). Clearly then, more is at play than mere availability of funds.

Scaling up of EE initiatives has also faced other barriers such as (a) absence of innovative regulatory /incentive structures and enabling technology; (b) balancing diverse stakeholder interests (investors, utilities, end users, technology providers, government and regulators); (c) variations across states and also between states-federal regulations and scalability challenges. Recent technology innovations now offer cutting-edge EE solutions including smart grid hardware and software, energy information management and sensor controls, demand response, energy storage, super-efficient lighting, and other building mechanical and electrical equipment.

According to a Ceres report, innovative financing policies, in addition to utility regulations and demand generation policies can unlock and help scale up the several hundred billion dollars EE investment opportunity (9).

In this context, innovation in financial transaction structures and objective measurement technology could help resolve unique and disparate stakeholder interests and unlock the huge EE market. The following section outlines some of these stakeholder interests and challenges, followed by a section with an in-depth examination of the prevalent financing options.

3. Understanding Stakeholders' Implementation Barriers and End-User Markets

Three stakeholders are key to operationalize EE implementation – the building owners/tenants; the utilities and the investors. While not directly addressed here, it is worthwhile acknowledging that to the extent of EE's climate change mitigation potential, the planet itself is a stakeholder, as are law and policy makers inasmuch as they significantly impact programs and implementation. With respect to the above key stakeholders, the principal barriers to investing in EE implementation have been identified as the first-cost hurdle (Building Owners); the 'death spiral' (Utilities) and high investment risk (Investors).

Despite availability of several EE technology innovations, Building owners shy away from implementation due to high capital costs, making this 'first –cost hurdle' one of the biggest obstacles. Most building owners find it overwhelming to first source funds for the high upfront expense and maintenance costs and second, to bear the entire execution risk and project management responsibility.

Tenants, who typically pay the utility bills directly based on consumption, stand to gain from EE installations, but shy away even further from a high up-front investment to improve a property they don't own and might be out of before the upgrades pay for themselves (11).

While most utilities have major conservation and efficiency programs, the very idea of EE– reduced use of the utility's product—runs up against a fundamental incentive to their business model: every additional KwH sold contributes to gross income. This "death-spiral" assumes greater importance for investor-owned rather than the state-owned utilities (10, 12,13) (A recent survey of 527 U.S. electric utilities professionals does indicate that utilities are largely prepared to adapt to these disruptive changes, though progressive regulations remain key (14, 15, 16, 17). As an example, where a state monetizes the social impact of Carbon, it could drive EE (and renewables) to become the preferred sourcing choice and encourage utilities to reduce carbon-intensive power sourcing. Also, clarity in regulation, demonstrating a clear policy focus and appropriately linking subsidies and incentives to effective and relevant decisions is also a facilitator for the utilities.

Third party financing options are hampered by investors' lack of confidence in savings estimates. Further, the borrower, often the building owner, may not be around for the full loan term, and thus seen as a high credit risk. Independent, standards-based verification of energy and financial baselines & forecast is firmly acknowledged as the solution to this obstacle (18,19).

Finally, categorizing the end-user market helps understand differing economic needs and end-user-specific factors. One report (20) categorizes the market as follows:

1. Municipalities, universities, schools, and hospitals (the "MUSH" market),
2. Commercial and industrial businesses, and
3. Residential customers.

4. Landscape of major financing options

The EE financing structures generally provide building owners with up-front capital, to be repaid over time as energy savings are generated. They involve varying arrangements for sharing monetized savings among the investor, owner and/or occupant customer. The choice of the savings-sharing model depends on a combination of factors such as project size, anticipated payback period and stability of returns and utility incentives/rebates. In addition to the five major financing structures discussed below – other financing structures such as bonds/debt and impact investing also exist (though not being examined here because of their relative simplicity).

4.1 ESPC (Energy Saving Performance Contract) through an ESCO (Energy Service Company)

In an ESPC model, the customer owns the installations, financed typically through a loan, and managed with the help of an ESCO. For a fee, the ESCO conducts a comprehensive energy audit, identifies scope of improvements, designs and constructs a project that meets the customer's needs and arranges the necessary funding. The ESCO guarantees project performance and cost savings through the project term (up to 25 years), after which all additional cost savings accrue to the customer.

4.1.1 Financing mechanism:

The customer owns the EE improvements and either self-funds the implementation or through debt/lease financing or a combination thereof.

Self-funding may be easier for MUSH segment with access to university endowment funds, maintenance and reserve accounts, equity contributions or other cash on hand. The financing is typically in the form of a capital lease, operating lease or tax exempt lease purchase agreement, and the choice of form depends on factors such as the equipment's residual value, the institutional customer's creditworthiness, access to bond capital markets and whether the customer prefers an off-balance sheet or on-balance sheet structure.

4.1.2 Distribution of monetized energy savings:

The ESCO implements and monitors the EE retrofit through the ESPC term. Typically, large ESCOs play multiple roles, from originator and developer to arranging financing and sometimes offering service upgrades; providing extremely useful centralized coordination and project/process management. The customer and ESCO split the monetized energy savings throughout the contract term, such that the customer's total energy savings exceed the sum of its expenses (financing re-payments and ESCO fees) over the 10- or 20-year contract (20).

After the ESPC term, payments to the ESCO cease and the customer manages the retrofits and retains all energy savings. Often, the ESCO guarantees a certain level of energy savings, which can improve the ESPC's financeability if the customer is securing financing (20). The risk, cost and scale profile of the EE implementation and the extent of ESCOs incentive to exceed the guaranteed energy savings depend directly on linkage of ESCO payments to payback periods duration, guaranteed energy savings performance and capital expenditure size (20).

4.1.3 Target Market Segment:

The availability and cost of capital largely depends on the customer's creditworthiness as opposed to the potential performance of the EE upgrades. Understandably then, this option has been popular amongst the MUSH market segment (who often have the added advantage of tax equity, government incentives, rebates and grants), even as this segment actively explores additional options because of other downsides (see below) associated with ESPCs.

ESPCs have an estimated annual project size of $4-6 billion (20, 21). ESPCs work just well to finance a combination of EE and renewable energy generation (20).

4.1.4 Legal considerations:

From an accounting perspective, because the customer owns the upgrades, their capital cost appears on the balance sheet, which might require a more challenging internal approval process. Additionally, debt /lease financings need to be compatible with any existing mortgage restrictions that may apply to the applicable properties.

Further, depending on whether or not ESCOs advise or are involved in financing, they might be subject to additional regulatory oversight. As part of its Dodd-Frank rulemaking process, the SEC[ix] proposed that ESCOs be required to register as "municipal financial advisors" and be subject to regulatory oversight as such. The ESCO industry, however, argued that ESCOs, like engineering firms, should be exempted from this registration requirement (22).

In response, the SEC appears to have clarified that depending on all facts and circumstances, the registration requirement won't apply so long as the ESCOs do not advise on issuance of securities or financial products, but advise only on financial implications or estimates and timing of funding (22). However, "provision of information describing financing alternatives that may meet the needs of a municipal entity or obligated person may be considered a recommendation" that might attract the registration requirement, just as advice on providing lease financing options. Likewise, receiving compensation for introducing and arranging financing, may also subject ESCOs to the registration requirement. The SEC also clarified that the presence of an independent registered municipal advisor may obviate the registration requirement (22).

4.1.5 Overall assessment:

(+) ESCOs reduce project risks through performance guarantees and are easier to administer due to the standardized processes, monitoring and project management services.
(-) On the other hand, this transaction structure is often on-balance sheet, and has higher transaction and legal costs and not suited for smaller projects.
(-) These projects also need to be long term, typically up to 25 years to ensure savings exceed payments. Fundamentally, ESCOs are incentivized to maximize margins through increasing capital expenditures (capex), which prevents truly integrated design methodologies that reduce capex and maximize savings. The major challenges include a lack of transparency in real project costs because of the bundled nature of the typical ESPC which includes several EE projects, along with issues such as the split incentive between landlords and tenants (21).
(-) Furthermore, the onerous registration requirements may also hamper ESCOs ability to administer programs or originate finances.

4.2 ESA[x] (Efficiency Services Agreement) and MESA[xi] (Managed ESA)

These financial structures combine features of ESPC and Power Purchase Agreements (PPA, where the generator of power or utility pays the customer for sustained energy savings from energy conservation measures). Here, as in an ESPC, a project developer paid for its services, manages the installations, may offer performance guarantees; although the customer does not have ownership and as in a PPA, the payments are performance (savings) linked.

4.2.1 Financing mechanism:

In both the ESA and MESA, the customer contracts with an energy services provider, who handles the first-cost hurdle by fronting 100 percent of the project capital and retains ownership. The customer typically has the option to purchase the installations at the end of the ESA term at the prevailing fair market value.

In an ESA, the customer pays the utility directly and pays the ESA service provider separately for savings while in a MESA structure, the project service provider is the single point of contact for the customer and pays the utility directly. A fixed $/KwH rate can insulate a customer from potential utility rate increases though not against reduction in utility rates.

4.2.2 Distribution of monetized energy savings:

The service provider owns the EE improvements and is paid by the customer over time either on a cost-per-avoided-unit-of-energy basis (ESA) or a floating percentage of the host customer's actual utility rate or agreed-upon historical energy costs/baseline rates (MESA). Under MESA, the service provider may retain all energy savings or share with customer depending on how the transaction is structured.

In commercial buildings, even if the building owner enters into the ESA/MESA transaction for the building as a whole, he may pass through an applicable share of the service provider payments to the tenants. The resulting energy savings and savings in tenant's utilities bills keep the transaction cash-flow net positive for the tenants.

4.2.3 Target Market Segment:

ESA and MESA models are particularly well suited for larger EE projects (typical building size > 250, 000 square feet) rather than smaller-scale improvements in the residential market. Standardized ESA contracts and structures could be used to aggregate projects and achieve greater economies of scale. With their often equity-like returns, an ESA or MESA financed EE projects may also be appealing for interested private equity investors (20).

4.2.4 Legal considerations:

Under the U.S. Generally Accepted Accounting Principles (GAAP) accounting rules developed by the Financial Accounting Standards Board (FASB), operating leases (unlike capital leases) are currently permissible as off-balance sheet. FASB's working with the International Accounting Standards Board (IASB) to harmonize GAAP with IASB's International Financial Reporting Standards (IFRS). While the final outcome is uncertain, the new harmonized standards are expected to not continue the distinction and leases will likely broadly be considered on-balance sheet by about 2016-17 (24).

ESA and MESA financings may be treated as operating or capital leases and so can be carefully structured as off-balance sheet (operating leases) for the customer under current accounting rules, and generally do not run afoul of existing mortgage restrictions. This relieves the customer from the burden of taking on additional debt on their balance sheets.

These options are less lucrative for tax equity investors as unlike renewable energy generation, EE improvements do not qualify for investment tax credit (ITC) or production tax credit (PTC). Also, the ESCO's creditworthiness is significant since it retains ownership.

4.2.5 Overall assessment:

(+) Building on the PPA model, the ESA option offers the advantage of no upfront cost for the customer and the ability to fund the installations' repayment over time from actual energy savings. Customers are also saved the maintenance responsibilities or performance risk during the contract term and the ESA provider is incentivized to maximize energy savings. Further, the ESA providers may be able to reduce transaction costs through economies of scale.

(-) MESA providers may carry the added risk of utility rate escalations.

(-) Finally, as discussed above in Section 4.2.4, this option requires careful structuring and a focus on service orientation to remain a viable off-balance sheet option.

4.3 PACE (Property Assessed Clean Energy)

Developed in 2007, and launched in California (Berkeley and Palm City), PACE[xii] financing allows local governments to use their traditional land-secured assessment or improvement district authority (expanded to include EE/generation) to provide property owners within their communities with the up-front capital for EE projects, as a lien on the property, to be repaid as property assessments for up to 20 years.

4.3.1 Financing mechanism:

Property assessments are secured by a lien on equal footing with other government taxes and ranks senior to a mortgage lien, even though the assessments not accelerated[xiii], thereby reducing risk to bond investors and lenders and enabling the government to raise low interest capital.

Since a PACE lien is tied to the property, the term of the financing can be very long (up to 20 years). Even if the owner sells the property or a tenant leaves, the lien remains on the property. PACE has the potential to create standardized assets that are more easily securitized and with aggregation, can help create larger pools of financing.

4.3.2 Distribution of monetized energy savings:

The building owner retains the energy savings and use them to offset the lien on the property.

4.3.3 Target Market Segment:

PACE is well suited for residential as well as commercial buildings, although its implementation in residential buildings is currently on hold on account of certain regulatory developments as discussed below.

4.3.4 Legal considerations:

Property assessments are generally treated as an expense and not capitalized on the balance sheet as a long term liability, but there is no clear consensus in the industry as to whether PACE assessments should be treated on or off balance sheet. Commercial PACE can be structured to be treated as an off-balance sheet financing, although residential PACE is significantly complicated.

By 2013, 31 states had adopted PACE-enabling legislation in residential and commercial sectors. However, in 2010, the Federal Housing Finance Agency (FHFA) upheld an advisory by GSEs (Government sponsored enterprises - Fannie Mae and Freddie Mac) whereby they declined to purchase properties with outstanding PACE liens due to their seniority. The uptake of PACE in the residential sector is currently on hold pending the outcome of the FHFA's rulemaking proceeding under the Administrative Procedures Act under the August, 2011 federal court directions (26). Even as the FHFA issued a proposed rule in June, 2012 and sought an extension in September 2013 for the Final Rule, an appellate court in May, 2013 reversed the lower court's order finding that FHFA was immune from a legal challenge in this instance. It remains unclear how FHFA will respond to this ruling. Legislators have repeatedly sought a legislative solution to restore residential PACE - the latest bill, HR 4285, PACE Assessment Protection Act, was introduced in California in March, 2014 (27).

Due to these FHFA actions and mortgage industry concerns, PACE implementation in the past two years has centered on commercial markets. In several commercial PACE programs, existing mortgage holder acknowledgment or consent to the senior PACE lien is required, and in some cases, the total amount of the PACE assessment may be limited to a certain percentage of the property's value. As more jurisdictions develop commercial PACE programs and as FHFA's rulemaking proceeding and federal litigation relating to residential PACE moves forward, this EE finance model will likely continue to holds promise.

4.3.5 Overall assessment:

(+) PACE is attractive to investors as a property assessment lien senior to mortgage, being tied to the property and recovered by the government.

(-) In addition to the residential sector issues, PACE has yet to deal with developing a consensus on accounting treatment. Finally, on the implementation side, while PACE offers a financing solution, it does not provide a model for the servicing aspects of the EE for the customer.

4.4 OBR/OBF (On Bill Repayment/Finance)

4.4.1 Financing mechanism:

In this financing structure, the utility or a third party provides a zero- or low-interest loan or tariff to the customer to finance up to 100 percent of the EE improvement (OBF programs use utility capital, whereas OBR programs leverage third-party capital), repaid through a charge added to the utility bill. Projects are designed such that cost savings exceed the monthly OBR payment, so consumers save energy and money at the same time, from day one. The threat of utility disconnection reduces the risk of default or delinquency.

4.4.2 Distribution of monetized energy savings:

Due to the efficiency savings, the overall new utility bill including the OBR charge is lower than the pre-installation utility bill. OBR loans may be tied to the customer (i.e., if the customer moves, it must pay off the loan) or structured as tariffs that run with the meter (i.e., if the customer moves, the next occupant continues to pay the tariff). The utility and investor are thus assured of their return. When it runs with the meter, it also makes installing of energy upgrades attractive to a customer, whether or not he intends to stay on the property for a long-term. In 2011, New York was the first state to enact state-wide OBR and offer finance at 3.49% (20).

4.4.3 Target Market Segment:

OBR programs are administered by various types of entities (e.g., utilities, government agencies, or other third parties) and target different types of customers and buildings.

For example, New York's Green Jobs Green New York (GJGNY) program, which is administered by the New York State Energy Research and Development Authority (NYSERDA), targets residential buildings, multi-family residential buildings, and nonprofits and small businesses, with different eligibility requirements, loan sizes, and payback periods for each.

In comparison, California's OBR programs, administered by investor-owned utilities, extend loans only to business customers. The types of covered retrofits and technologies also vary: a number of programs specifically exclude lighting and non-permanent fixtures, while others also cover renewable energy installation (20, 23).

4.4.4 Legal considerations:

Although utility service disconnection reduces default rates in OBF/OBR programs, this practice is subject to legal uncertainty as well as political controversy. For example, California Public Utilities Commission (CPUC) proposal to establish an OBR program for investor-owned utilities (IOUs) in California, was initially opposed by the IOUs and ratepayer advocacy groups because state law prohibits termination of residential service for non-payment to a third party. CPUC subsequently narrowed its OBR proposal to the commercial sector, and proposed a possible OBR program in the multi-family residential sector, indicating that legislative changes may be required to extend OBR to the single-family residential sector (28). OBF remains an option for commercial buildings in California. Capital providers do not view the threat of service termination as a security instrument, however, and in some cases data on default rates for existing OBF/OBR programs is not yet widely available. Meanwhile, projected interest rates on OBR financing are likely to be tied to customer creditworthiness in the absence of ratepayer-funded credit enhancements.

Another issue is the applicability of state/federal consumer lending laws when the financing is structured as a "loan." Utilities and other entities, for whom lending is not the core business, are wary of being regulated as financial institutions, particularly as the regulatory scheme evolves in the shadow of the banking crisis. On-bill tariff programs can avoid lending laws, but tariffs still require regulatory approval from relevant entities. Finally, structuring the OBF/OBR as a loan or a payment will impact its accounting treatment for the customer as on-balance sheet or off-balance sheet.

4.4.5 Overall assessment:

(+) OBR options involve minimal upfront costs, help building owners clear the first-cost hurdle and assure sustained returns to investors with access to cheap capital at low interest. Customers can quickly realize the economic benefits of energy savings. The utility bill repayment mechanism also lowers administrative costs by leveraging the utility's existing infrastructure and resources (who typically administers the program or partners with the administrator), including customer relationships and billing systems. The threat of utility disconnection has caused default rates to remain exceedingly low (20).

(+) Nationally, OBR could estimatedly help drive $87 billion in new clean energy investment, save over $590 billion from customers' utility bills, avoid 1,100 million metric tons of global warming over the course of 12 years, or the equivalent of about 19 million cars off the road, and at scale, it could create 600,000 job-years nationwide in the next 12 years (a job-year is a full-time job that lasts for one year) (6, 25).

(-) Legal issues including lending laws have restricted OBR to certain market segments and creditworthy customers. The threat of utility disconnection, which serves to minimize default rates, is also subject to legal uncertainty. While the pilots have proved to be successful, there is significant reliance on government funding and support and progressive regulations (20).

4.5 MEETS (Metered Energy Efficiency Transaction Structure)

4.5.1 Why MEETS

Balancing of all stakeholders' interests is the key to securing investing in EE. Most EE financing structures above are geared to primarily address the customers' first-cost obstacle, yet as noted earlier in Section 3, other reasons prevent scaling up of EE implementation, including investors' uncertainty in reliability and predictability of returns because of inadequate measurement of EE savings, as also the utilities' "death spiral" associated with efficiency driven demand reduction.

A key challenge faced by the finance structures driven by realized energy savings —ESPC, ESA, and MESA—is the objective energy consumption measurement as well as the influence of variance factors on energy consumption, making it difficult to reliably compute savings attributable to EE measures. Fluctuating occupancy rates, equipment usage and changes, behavior, and other factors beyond the control of the ESCO or the ESA/MESA project developer can undermine the energy savings performance and thus the project developer's payment stream.

Measurement and verification of EE savings is critical in providing investment grade information for decisions for both the customer and the providers of EE finance. Energy baseline measurement has been widely recognized as a challenge in EE finance (20).

A truly successful financing structure then, should incentivize each of the major stakeholders involved, and balance the relative risks with expected returns and benefits.

4.5.2 What is MEETS

MEETS[xiv] is a new, technology-backed approach to finance deep[xv] EE in new and existing commercial buildings. In its pilot roll-out at the Bullitt Center in Seattle, financed by Equilibrium Capital Group, LLC, the Bullitt Foundation is the owner and the Seattle City Light is the utility. MEETS is touted as unique to attract capital for deep energy savings by being able to address investors' uncertainty concerns through standardized measurement as well as the utilities' "death spiral" concern by converting delivery of non-energy into 'generated energy' (negawatts), and therefore revenue (30).

According to Jorge Carrasco, the superintendent of Seattle City Light, "this program ties the savings to performance," and ensures that "you don't pay any incentive until you realize the savings." The building owner makes no investment and continues to pay the full retail rates they would have paid before the retrofit, ensuring that the utility has cash up front to pay its fixed costs; if the owner himself invests, he shares in the revenue from the long-term contract for his "nega-watts." Or the investors do. Or both." (31).

Innovative Measurement and Verification (M&V) is made possible by an EE meter (DeltaMeter[xvi], a proprietary energy modeling software, developed by Energy RM) that meets utility resource grade standards and objectively measures real-time energy savings, allowing it to be sold as it occurs.

The long term contract with the utility allows an investor to profitably invest in EE upgrades with longer payback times, squeezing more efficiency out of the building. Investing in deep EE also provides a reasonable scale of returns to the investor. The opportunity of contracting with a utility is appealing to long-term investors *who are not necessarily the owners of the building*. This means outside capital can be profitably invested in efficiency with assured long-term returns and without relying on a building owner's ability to secure a loan.

4.5.3 Financing mechanism

The deal structure incorporates some key aspects of a PPA, ESA and OBR (32). Like OBR, MEETS enables third-party investors (who, not necessarily, but can be, the building owner or the utility) to finance and own the efficiency retrofit, which is installed in the building. For this opportunity to install the efficiency measure in the building, the investor pays a monthly fee (a direct financial incentive) to the building owner who also benefits from an environmentally-improved property at no cost (just as a wind farm investor pays a rental fee to ranchers for use of their land).

The DeltaMeter reports *baseline* energy use (consumption rate without the efficiency retrofits, normalized for variance factors including weather and occupancy), current energy use (metered EE, with retrofits) and the associated energy savings ("what would have been used"), and is being piloted by the utility industry in the Pacific Northwest. This baseline is a key enabler for MEETS. The installed EE measure results in energy savings, i.e. negawatts (energy *not* consumed).

4.5.4 Distribution of monetized energy savings and overall assessment

There is no first cost hurdle in this bill – neutral transaction for the customer, whose property is made more environmentally valuable by the EE at no cost, and who continues to pay the utility at the pre-installation baseline rate, regardless of actual savings. The customer avoids the first-cost hurdle as also management and ownership (and performance risk) issues of the EE measure, which remain with the investor. The customer rather has a new revenue stream through the rental fee from investor, which might offset current utility bills. Theoretically, in an already energy-efficient building such as the Bullitt Center[xvii], depending on the cost of the installation, the degree of savings and time value of money, an investor could pay a customer enough fee to offset his entire utility bill.

The building owners shouldn't mind because typical EE financing structures are often a mismatch between costs and benefits. While building owners bear the implementation costs, it is often the tenants that reap the benefits (through lowered electricity bills). While the tenants don't see any reduction in their utility bills even as they get a greener building, but they also didn't pay for the improvements. This might pose a gap in this structure since building use and tenant behavior greatly impacts energy consumption rates, building incentives for tenants could further strengthen the returns for the investor as well as impact performance.

Investors, whose returns are assured over a long term, signs with the utility, a 20- year long term PPA-style contract for all electricity savings produced by the efficiency measure, as measured through DeltaMeter. The utility pays the investor a negotiated price for each "negawatt-hour" produced (or energy generation avoided) by investor's efficiency measure. This gives investors a time horizon long enough to finance deep retrofits, but also leaves them accountable for the retrofit's performance (that is, there are no payments if the efficiency savings don't materialize). Further, the guarantee of a long-term, reliable cash flow from a stable, investor-grade utility lowers the investment risk and lowers the cost of capital cheaper (30,31).

Utilities are protected from the death spiral as the entire yield from metered EE from a customer facility is delivered to the utility, as it continues to be paid at the pre-installation 'baseline' energy use, and thus, regardless of energy savings, the utility's revenue remains protected. Effectively, the utility gets paid also for the energy savings (negawatts) by the customer. The utility thus remains 'whole' financially, despite delivering less electricity to the more efficient building. This is crucial where utilities have insufficient regulatory incentives or protections for grid efficiencies-driven reduced revenue. The utility shares the monetized negawatts with the investor (as returns for the upfront investment), at a pre-negotiated rate, while retaining a fraction of that revenue as profit. The utility effectively also has access to a new power source. It effectively purchases from the investor energy saved (energy not used by the building owner), post-delivery, in a long-term contract just as if it were purchasing energy generated (hydropower or coal-fired electricity). Only, negawatts (energy saved) are significantly cheaper for the utility than energy generated by building a new plant or purchased in the wholesale power market and comes without having to invest in the capital outlay for new energy generation capacity. Even before the utility pays for these unused KwHs (to the investor), it has already received payment at market rates from the customer. Importantly, the investor, being the seller of the negawatts, retains the incentive to maintain the efficiency improvements (11). Depending on the extent of energy savings, and the return to the investor, the utility could technically have energy savings left over to turn around and sell into the capacity markets or energy markets without having to build a new power plant or procurement facilities.

The key enabling technology for MEETS is the accuracy and accepted standardization of the metering software, DeltaRM, to ensure the efficiency calculations correctly factors in externalities such as temperature and humidity changes, as well as energy-use shifts amongst tenants (31).

In the pilot project, the utility will reportedly continue to collect 6 cents per KwH from the customer for both the electricity used and the metered savings. It will pay the investor, 2.5 cents per KwH—without losing any retail electricity revenue from savings. The utility can make up the 2.5 cent efficiency premium by selling the saved power it no longer has to deliver on the wholesale market (11). Practically however, there has reportedly been no benefit to the utility in this pilot because of net metering regulations preventing the utility to pay a reduced rate to the investor. Nonetheless the advantages to the utility for avoided capital investment in energy generation, avoided annual increase in generation costs (depending on the geography, cost to capacity and state laws where the utility is) as well as achievement of any state-mandated goals remain unaffected. They also retain the benefit of being able to offer electricity at affordable rates to their customers as also the social benefit of building green brand equity. On the other hand, in a situation where the EE causes utility to face a load shrinkage (demand falls below current capacity), it may need to increase the cost of energy for the customer to avoid losses. The financial benefit can also be made up where the utility itself becomes the investor.

The actual investor rate of return in the pilot is yet to be examined. Since the Bullitt Center is an exceptional building, designed to achieve a net zero energy, waste and water, its results may not be typical – and has been called as "a great building to prove the concept, but it's not a great building to calculate a rate of return" (11). Nonetheless, MEETS is a step forward in the right direction to scaling up EE investment and implementation, as it becomes increasingly clear that measurement and standardization are key to investor confidence and that utility-friendly transaction structures fill the gap in securing returns to all stakeholders involved.

Finally, the importance of awareness and education – for investors (the appropriate articulation of returns – financial as well as nonfinancial), owners (building configuration and design choices that affect energy consumption) as well as tenants (responsible building use as occupants)– to facilitate shaping of appropriate decisions and choices cannot be overemphasized.

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