

FINANCING MODELS FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY IN EXISTING BUILDINGS



Issue Brief

Derek Supple

Program Manager for Global Energy and Sustainability

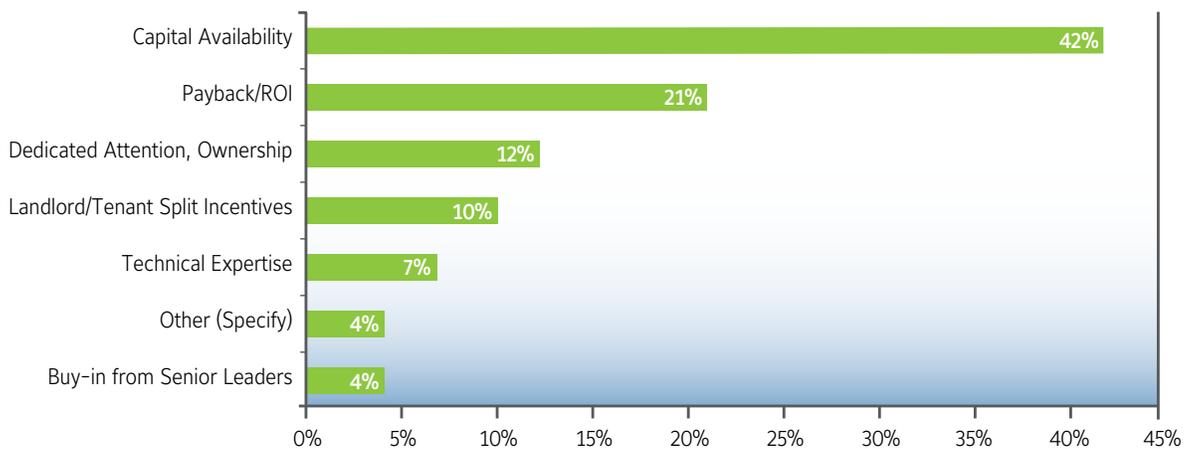
INTRODUCTION

One of the most formidable barriers to improving energy efficiency or adding renewable energy technology in buildings is the high capital costs of projects. Whether upgrading a chiller, installing a solar photovoltaic system, or implementing a bundle of improvements under a whole-building retrofit, clean energy projects require large upfront investments, followed by a long period of payback through savings in energy bills.

In contrast, the typical facilities budget includes a constant operations component with relatively small allocations for capital improvements. Often, the administrative process for obtaining approval for capital expenditures represents a major investment of time and effort for staff. For example, the congressional appropriations process can delay energy projects in federal facilities by several years.

So, despite an impressive return on investment and net present value, many projects don't go forward due to lack of available capital. Johnson Controls and the International Facility Management Association (IFMA) surveyed over 1400 executives with budget responsibility for their company's facilities during the spring of 2009. When asked what the top barrier for energy efficiency, the most frequent response amongst managers, consistent across a wide variety of industries, was capital availability. These findings suggest that new financing models can make a huge impact in igniting more clean energy investments.

Figure 1. What is the Top Barrier to Capturing Potential Energy Savings for Your Organization?



Source: Johnson Controls and IFMA (2009) "Energy Efficiency Indicator" survey results

To overcome this "first cost" barrier, several financial instruments have been adapted or created specifically for energy efficiency projects. Some models, such as conventional loans or municipal bonds, have been in existence for many decades. Others represent more recent financial innovation. Each approach has unique characteristics that determine how appropriate it is for a specific situation.

This document provides a summary of several financial models in use for energy efficiency and renewable energy projects in buildings. While financing arrangements vary widely and this list is in no way comprehensive, it captures the most common models in use today and those with greatest potential for growth in the future. We begin by providing a summary definition and some useful references where you can learn more about each model. We then compare the pros and cons for each of the various financing models.

TRADITIONAL DEBT (LOANS OR BONDS)

The most straightforward and historically documented approach to financing energy efficiency is a conventional loan from an institutional lender in the private sector, or the raising of bonds for public entities. Loans or bonds provide the initial capital outlay for an energy efficiency project and are repaid over time as the building owner realizes energy savings.¹

¹ U.S. EPA (2007) "Energy Star Building Manual, Chapter 4: Financing"

SHARED SAVINGS

A variation of the conventional loan is the shared savings model, applied as part of Energy Performance Contract projects, in which the energy services company takes on the risk associated with the loan and receives a pre-agreed upon fraction of the dollar value of the measured savings over the duration of the contract. If there are no savings over a savings period, the building owner makes no payment for that period. Ownership of equipment transfers from the ESCO or finance partner to the building owner at the end of the contract.²

² Hopper et al (2005) "Public and Institutional Markets for ESCO Services"

TAX-EXEMPT LEASE-PURCHASE AGREEMENT

One obstacle associated with both traditional debt and shared savings contracts is the negative impact of energy project debt on the balance sheet of the host entity. To avoid this problem, public facilities and non-profit entities use tax-exempt lease-purchase agreements or municipal leases, which provide a similar structure as conventional loans without encumbering the balance sheet. Because payment obligations under this type of lease are only for the current operating period, payments are considered an operating expense rather than a capital expense, and thus the municipal lease is not considered a long-term debt obligation. Once the lease term expires, the organization comes to own the equipment.

³ ICF (2007) "Intro to Energy Performance Contracting"

CAPITAL LEASE

Under a capital lease arrangement, the energy efficiency project is treated as capital equipment, which is owned by the project financier and leased over a period of time to the building owner. At the close of the contract timeline, the energy efficient equipment transfers ownership to the building owner. While the arrangement represents a capital asset on the balance sheet and requires the building owner to account for depreciation over time, it also provides tax advantages that lead to rates lower than market averages.

LEASE OR BOND POOLS

Some jurisdictions or agencies have developed funding pools for the purpose of enabling energy efficiency projects. These could be revolving loans offered on a waiting list basis to customers within a particular geographical location, or a collection of projects at multiple sites owned by the same organization such as a federal agency. By grouping together many projects over multiple sites, these pools are able to offer lower interest rates than would be available for a single project.⁴

⁴ ICF (2007) "Intro to Energy Performance Contracting"

ON-BILL FINANCING

On-bill financing (OBF) is another model that can be used to help building owners pay for energy efficiency improvements without burdensome initial capital outlays. These programs are offered by the building owner's electricity and/or natural gas utility provider, who fronts the cost of the improvements and recoups it over time by incorporating loan repayment into future energy bills.⁵

⁵ Brown, Alliance to Save Energy (2008) "Paying for Energy Upgrades Through Utility Bills"

TAX-LIEN FINANCING (PACE)

Tax-lien financing is a relatively new financing model for energy efficiency and renewable energy projects that is quickly gaining popularity. This model is also often referred to as Property-Assessed Clean Energy (PACE) bonds.

Under the PACE model, property owners borrow money from a municipal agency to finance up to 100% of the upfront cost of energy efficiency and renewable energy projects and repay the loan over 5–20 years through an added annual assessment on their property tax bill. While the original funding for these loans can be government bonds or private financing, the local taxing authority acts as the collections agent. The tax assessment stays with the property, not the borrower, upon sale of the property.

The PACE model overcomes several well-known barriers to the adoption of energy efficiency improvements. Financing spreads the first cost to create positive cash flow for building owners, so that monthly energy savings exceed their loan payments. Since the loan is attached to the property, not the borrower, it transfers with ownership, enabling owners to take on longer payback projects with deeper energy savings. Tying payment to the property also solves credit and collateral issues that have been a challenge in commercial real estate. It can also overcome the age-old owner/tenant split incentive problem because owners are allowed to pass-through property taxes (and, through PACE, the retrofit costs) to net lease tenants who also benefit from the savings.⁶

⁶ PACENOW website, Rep. Steve Israel, Roll Call (2009) "PACE Bonds Promote Efficiency," or Fuller et al (2009) "Guide to Energy Efficiency and Renewable Energy Financing Districts"

POWER PURCHASE AGREEMENTS

Power purchase agreements or structured finance funding provides another model for organizations to improve energy efficiency or benefit from onsite renewable energy systems with no up-front cost. Under this model, the energy efficiency or renewable energy assets are legally owned by an entity separate and apart from the owners of the facilities.

In the most common form of PPA, a building owner allows a third party to install a solar photovoltaic system on its property and agrees to purchase the resulting energy at a specified price for an agreed-upon term, typically 15 to 20 years. The building owner benefits from a low and stable electricity price, a smaller carbon footprint, and a highly visible renewable energy technology on their premises. Additionally, the third-party owner can monetize any the tax credits or renewable energy credits associated with the system's production to create additional value for the building owner.

In another PPA application, a company hires an energy service company to install a high-efficiency central heating and cooling plant and agrees to buy the chilled and heated water. Here, the energy savings over an old, inefficient plant may be substantial.⁷

ENERGY EFFICIENT MORTGAGES

In some cases, investments in energy efficiency have been bundled with the financing of the property itself. This instrument, referred to as an energy efficient mortgage, has been promoted in the residential real estate industry for 15 years. It is also applicable in the commercial sector. By wrapping the cost of energy efficiency improvements into the cost of the property, the borrower can generally secure financing at lower rates.⁸

SUPERCHARGERS

In addition to the financial vehicles discussed above, there are additional innovative models for energy efficiency projects. Because these innovations do not specify a specific financing structure and are compatible with many of the models above, they are referred to here as "superchargers," or enabling methods that boost the effectiveness of a financial arrangement.

Performance Contracting

Because of its ability to overcome several key obstacles, the performance contracting model has been proven over the last several decades to be an effective enabler of energy efficiency. It is important to note that this approach is not a financial instrument in and of itself, but rather, a turn-key solution to energy efficiency projects that supports securing financing at more attractive rates and terms. Under a performance contract, an energy service company assumes some performance risk over the project's lifetime by guaranteeing energy savings, water savings, operational cost savings, and/or technical performance of equipment. The projects are typically designed such that the annual savings are greater than or equal to the required payments over the term of the contract. As a result of the guaranteed cash flow positive outcome, the lender is assured a lower risk of default.

Energy Performance Contracts have been successfully developed around conventional loans and shared-savings configurations and applied across a wide variety of organizations such as schools, hospitals, universities, governments, and even private corporations. The approach is also compatible with new models such as tax lien financing and green leases.⁹

⁷ See Dept. of Energy webpage about PPAs or Johnson Controls Renewable Energy Financing.

⁸ See HUD website or FHA website.

⁹ Hopper et al, LBNL (2005) "Public and Institutional Markets for ESCO Services", and "ICF (2007) "Intro to Energy Performance Contracting"

Green Lease Structures

One of the most oft cited barriers to energy efficiency is mismatched or “split” incentives between multiple parties (e.g., building owner/tenant), where one party is responsible for making design or capital investment decisions and another pays the energy bill. The energy efficiency of tenant occupied commercial real estate facilities tends to be pretty dismal as a result of this problem. There is a huge market opportunity for cost effective energy efficiency projects in these buildings if only we can “get the incentives right.”

Many of the financing structures can be strengthened and complemented by innovative new lease structures, often referred to as “green leases.” These lease structures, under development by trailblazing owners and property management firms motivate tenants to reduce consumption of energy and water, to produce less waste, and to choose environmentally friendly products, furnishings and office equipment. They also often include language to ensure that tenants comply with the building’s green practices.

There are three key elements to a green lease for enabling energy efficiency projects.

1. **Triple-net lease:** In comparison to a gross lease, under a triple-net lease the lessee is responsible for paying all taxes, insurance, maintenance, and utility expenses in addition to their monthly rental payment. Net leases cause the tenant to prioritize energy-efficiency during a tenant improvement project, because the tenant directly recovers any investments in efficiency over their lease term.
2. **Sub-metering:** By sub-metering to measure energy and water services delivered to the tenant, building owners can bill tenants for actual usage and peak demand. This practice, combined with a triple net lease structure gives tenants the financial motivation to minimize their energy and/or water consumption. It also allows the building owner to employ a feebate (fee/rebate) incentive system to “right-size” electrical and mechanical systems.
3. **Allow capital cost pass through:** Under a green lease structure, building owners are given the right to pass the cost of capital improvements that result in lower total operating costs through to tenants. Under the arrangement the tenants, who pay the utility bills, reap the benefits of energy savings as a return on investment for incurring the financing costs to implement energy savings projects. Green lease language ensures that maintaining, managing, commissioning and re-commissioning the building to conform to a green certification or rating program is included in the pass through costs.

A collaborative green leasing process has the potential to yield largest gains both by lowering total operating costs for tenants and by improving the building’s marketability and reducing vacancy risk for building owners. In short green leases, create incentives for both the owner and the tenant to save money through efficient design, construction, and operations.¹⁰

RATEPAYER ENERGY EFFICIENCY/DEMAND-SIDE MANAGEMENT PROGRAMS

Since the 1970s, the utility industry has implemented programs providing financial incentives for their customers installing energy efficient equipment. These programs have since expanded; according to the DSIRE USA database, there are rebate programs for energy efficiency in place in all but one state. With the advent of “public benefit charges” as surcharges on utility bills in many states and a “decoupled” regulatory structure for energy utilities, energy efficiency incentive programs have been steadily increasing in both frequency and funding levels. Combined with a growing funding level at the federal and state levels, this trend is expected to continue as utilities and governments attempt to “purchase” energy efficiency as a resource.¹¹

¹⁰ See Empire State Building “Leadership in American Progress in Sustainability” website, BOMA (2008) “Guide to Writing a Commercial Real Estate Lease Including Green Lease Language,” AGPOM (2009) “Green Leasing: Are You Ready?”

¹¹ See [Barbose et al, LBNL (2009) “The Shifting Landscape of Ratepayer-Funded Energy Efficiency Programs.”

Model	Pros	Cons
Traditional Debt (Loans or Bonds)	<ul style="list-style-type: none"> • Mature and widely available financing vehicle 	<ul style="list-style-type: none"> • Medium to high interest rates • Limits project payback to owner's holding period
Shared Savings	<ul style="list-style-type: none"> • Aligns incentives for deepest energy savings possible 	<ul style="list-style-type: none"> • Large risk profile for ESCOs (e.g., utility rate increases) • More likely to lead to M&V disputes
Tax-Exempt Lease Purchase Agreement	<ul style="list-style-type: none"> • Low rates due to income tax exemption for financier • Considered an operating rather than capital expense • No debt concerns, need for taxpayer/legislative approval 	<ul style="list-style-type: none"> • Only available to public organizations • Limits project payback to owner's holding period
Capital Lease	<ul style="list-style-type: none"> • Allows deductions for depreciation & interest payments 	<ul style="list-style-type: none"> • May create balance sheet or debt concerns • Limits project payback to owner's holding period
Lease or Bond Pools	<ul style="list-style-type: none"> • Lowers rates and reduces transaction costs 	<ul style="list-style-type: none"> • May delay projects to reach sizeable package • Requires legislative approvals
Tariff-Based On-Bill Financing (OBF)	<ul style="list-style-type: none"> • No long-term debt, balance sheet, collateral concerns • Financing is linked to meter, not owner, and transfers with property ownership or tenant turnover • Streamlined collections and link to utility incentives 	<ul style="list-style-type: none"> • Difficult to include fuel savings from multiple utility providers (electricity, natural gas) • Requires regulatory approval & public benefit funding • Outside traditional utility expertise and business model
Tax-Lien Financing (PACE)	<ul style="list-style-type: none"> • No long term debt/balance sheet concerns • Transfers with property ownership or tenant turnover • Low rates due to low lender risk (senior lien position) • Solves owner/tenant problem along with triple net lease • Possible tax deduction benefit to borrower • "Commoditization" leverages markets to scale capital inflow 	<ul style="list-style-type: none"> • Immaturity: lack of awareness, experience, standards • Requires enabling state legislation • Requires significant municipality training & creation of program administration infrastructure • Potential opposition from first mortgage holders • May not apply to property tax exempt entities
Power Purchase Agreements	<ul style="list-style-type: none"> • 3rd party owner maintains system to maximize output • Stable power price provides valuable hedge against volatility 	<ul style="list-style-type: none"> • A risk of 3rd party's financial stability • Lose direct tax benefits, renewable energy credits
Energy Efficient Mortgages	<ul style="list-style-type: none"> • Low cost capital linked to full property purchase rather than to clean energy measures and equipment alone • Long contract terms allows deep energy savings and incorporation of longer payback measures 	<ul style="list-style-type: none"> • Immaturity and lack of availability • Narrow window of opportunity (time of resale, refinance) • Limits project payback to owner's holding period • Only covers measures "affixed to property"
Finance Model "Superchargers"	Performance Contracting	<ul style="list-style-type: none"> • Savings guarantees overcome skepticism amongst owners • Lowers rates due to reduced risk for both building owner and lenders • Focuses and streamlines process for developing, implementing, and verifying projects
	Green Lease Structures	<ul style="list-style-type: none"> • Tenants both incur cost and reap the benefits of energy savings

The Institute for Building Efficiency is an initiative of Johnson Controls providing information and analysis of technologies, policies, and practices for efficient, high performance buildings and smart energy systems around the world. The Institute leverages the company's 125 years of global experience providing energy efficient solutions for buildings to support and complement the efforts of nonprofit organizations and industry associations. The Institute focuses on practical solutions that are innovative, cost-effective and scalable.

institute
for **building**
efficiency
an initiative of Johnson Controls