National Institute of BUILDING SCIENCES

Council on Finance, Insurance and Real Estate

Financing Small Commercial Building Energy Performance Upgrades: Challenges and Opportunities

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Council on Finance, Insurance and Real Estate, National Institute of Building Sciences

Executive Summary

Small commercial buildings, which represent the preponderance of the U.S. commercial building stock, are a largely untapped source for significant energy savings.

- Nearly 94 percent (93.9%) of U.S. commercial properties are small buildings, defined as structures of 50,000 square feet and below accounting for roughly half (49.5%) of U.S. commercial square footage.
- Almost nine of ten U.S. commercial properties (87.9%) measure 25,000 square feet or less, and represent 36% of commercial square footage.
- Close to three-quarters (73%) of U.S. commercial buildings are very small at 10,000 square feet or below, accounting for close to 20% of commercial floor space.
- The median commercial building size is only 5,100 square feet; the mean size is 15,700 square feet.
- Seventy percent of the nation's rental housing is in structures with nine or fewer units, with single-family homes constituting almost 40% of the U.S. rental housing stock.

The retrofit market for small commercial buildings is conservatively estimated at $35.6 billion, assuming a 30% improvement in performance for buildings constructed before 1980. A market this size would create an estimated 424,000 job years[1] of full-time employment and reduce greenhouse gas emissions by 87 million metric tons a year. Small building retrofits would also improve the resilience of the nation's built environment and would take pressure off the aging electric grid.

Despite this considerable opportunity, numerous market barriers are preventing meaningful financing and investment in retrofits for the small commercial building market. Small commercial buildings are less likely to be well leased, well located and occupied by strong credit tenants. As a result, these buildings typically fall outside the investment parameters of institutional lenders and investors, making it more difficult to supply capital for energy retrofits.

Seven specific barriers constrain the small commercial finance market. On the demand side, the owners, managers and tenants of small commercial buildings:

1. are frequently skeptical that energy savings will materialize;
2. often do not understand energy performance analysis and technology;

[1] Defined as one job for one year.

3. lack the operational understanding and expertise to manage energy upgrades; and
4. are often of lower credit quality, with more restricted access to cash or debt.

These factors depress demand for energy efficiency loans in the small commercial sector.

On the supply side:

1. small commercial properties are frequently difficult to underwrite due to complex or atypical configurations, uses and market characteristics;
2. energy efficiency loans are a hybrid loan product, combining the characteristics of construction and permanent loans, thereby making it more difficult for lenders to evaluate and price risk.
3. fixed upfront transactions (such as legal, energy audits, financing fees and appraisal) and ongoing loan management costs represent a larger component of the loan/investment amount, thereby rendering these transactions less attractive to investors and lenders.

Several bright spots do exist—particularly programs based on public and private-sector cooperation. These successful programs include property assessed clean energy (PACE), on-bill payment/financing and Small Business Administration (SBA) loan programs. Other programs showing promise include equipment loans or capital leases, contractor based financing, managed energy service agreements and energy efficiency and renewable REITs. Expanding these programs and applying the lessons learned to new models for small commercial retrofit financing is needed. A turnkey solution with contractors as the delivery mechanism can overcome many of the identified barriers by providing an efficient, integrated solution to building owners.

Based on the above findings, the Council on Finance, Insurance and Real Estate offers the following recommendations:

1. **Federal programs, which offer important support for the growth of the small energy retrofit market, should be expanded and deployed to facilitate state and local energy retrofit financing efforts.**
    a. Expand existing research, program development and technical assistance programs, including the Commercial Building Energy Consumption Survey (CBECS), Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE) initiatives and ENERGY STAR, which provide cost-effective approaches to market expansion.
    b. The federal government is well positioned to support research and deployment of building performance tracking, reporting, analysis and control software and hardware. Activities in this arena will enhance the measurement and verification of building energy performance and energy retrofit outcomes.
    c. Federal credit enhancements and guarantees, such as those offered under SBA's 7(a) and 504/CDC programs, are a potent and well-tested way to attract substantial additional private financing to the small commercial building retrofit market. A program that combines the small business financing expertise of the SBA and the energy efficiency technical support of DOE would be ideal.
    d. Congress should consider a comprehensive approach to building energy efficiency incentives, including tax credits, deductions and depreciation schedules, in developing

tax reform measures. Tax incentives should be performance-based, and linked to measurable energy savings; incentives might also be targeted to encourage retrofits that deliver substantial efficiency gains.

2. **Federal policy should encourage the development and testing of energy retrofit programs at the individual city, county or utility level.** Local initiatives are less risky than larger state, regional and national programs and can provide proof of concept for future initiatives. State, local and utility officials and organizations can help to identify local program opportunities and provide technical support at the community level.
3. **Public-private energy retrofit approaches should be encouraged in federal policy making.** To date, public-private ventures have been the most successful model for delivering energy retrofit financing to the small commercial building sector and have demonstrated the most potential to scale. Such initiatives should:
   a. Leverage public credit enhancements, superior collection methods and sanctions to improve loan security and leverage significant private capital flows.
   b. Use standardized administrative processes, legal documents and contractor training.
   c. Bundle utility, federal, state and local tax incentives.
   d. Aggregate small projects into larger energy retrofit contracts.
   e. Provide turnkey services to the property owner.
   f. Promote cost-effective and readily deployed and replicated energy conservation measures.
4. **Federal, state and community policy makers should recognize local and property-level variations in designing energy efficiency programs that serve small businesses and others.** Policy initiatives might be most appropriately targeted to high energy cost areas or to the most energy-inefficient buildings that may have the strongest incentive to improve performance.
5. **Policy makers should leverage national CBECS data and the growing quantity of voluntary and mandatory benchmarking and disclosure programs to create more meaningful building performance databases.** Better collection and dissemination of energy consumption and benchmarking data will support the design of more meaningful energy models and help owners, tenants, buyers, sellers, appraisers and banks evaluate the performance of specific buildings.
6. **Utilities should be required to provide energy consumption data to property owners and tenants, including aggregate building level data for properties in which tenants are separately metered.** Customer education is a key aspect of driving energy retrofit demand. The monthly utility bill and the customer's utility records can supply the key metrics. Building owners and occupants should also be educated about the economic, health and productivity benefits of energy retrofits and available financial assistance. Public or utility outreach programs can deliver this content.
7. **Public policies and programs should be designed to anticipate the future aggregation of energy retrofit loans into bonds, and to provide the basis for appropriate loan documentation.** Secondary markets, when appropriately controlled for risk, help to maximize financing opportunities and reduce financing costs.

Financing Small Commercial Building Energy Performance Upgrades: Challenges and Opportunities

Council on Finance, Insurance and Real Estate, National Institute of Building Sciences

Introduction

In 2014, the National Institute of Building Sciences Council on Finance, Insurance and Real Estate (CFIRE) decided to examine the transformative potential that could occur by making energy efficiency upgrades to small commercial buildings. Performance upgrades in this sizable property group (over 90% by number of buildings and roughly 50% by square footage) have lagged behind larger property classes due to significant challenges in obtaining equity and debt financing. Despite these challenges, potential rewards are high. Energy performance upgrades for small commercial properties can help to create stronger businesses, add resilience for operational stability and generate significant national job growth, efficiency gains and environmental benefits.

This paper shines a bright light on the tremendous (but lagging) economic opportunity associated with small commercial buildings measuring 50,000 square feet or less. With a greater understanding of the property class, policy makers will be better equipped to address the relevant investment risks and financing issues. This analysis provides insight into where policy changes could have the greatest impact on increasing the pace of energy efficiency upgrades, while at the same time strengthening small businesses, creating jobs and enhancing economic and environmental resiliency in the face of climate change.

CFIRE began with a discussion of the magnitude of the small commercial property market, and then reviewed how different players define “small commercial.” Distinct property subsets have formed within this substantial property group and need consideration in policy design. CFIRE develop a conservative estimate of the market potential and economic and environmental benefits of small commercial retrofits.

Next, CFIRE examined investment and financing barriers, followed by a discussion of approaches by the market and public policy that have overcome some of the problems to create “bright spots” of activity.

After a short concluding summary, a list of specific policy recommendations, grouped by focus area, is given. For further reading and references, a bibliography is also provided.

Target Audience

Given the Institute's Congressionally mandated role to advise the public and private sectors on issues impacting the built environment, CFIRE focused on addressing several key audiences. Members of Congress and Congressional committees with jurisdiction over energy and small business matters are important audiences, as are other federal policy makers. Policy makers at the state, regional and local levels are expected to find this analysis instructive, as are utility companies and public utility commissions. The paper also intends to give insight to property owners, investors, financial institutions and tenants occupying small commercial buildings, on identifying the challenges and opportunities for financing energy efficiency improvements for this property group.

The Institute can offer a platform for these national audiences to coalesce and address stakeholder barriers and opportunities in the small commercial building energy retrofit market. This process is key to unlocking a major portion of the $72 billion investment potential for commercial property energy retrofits, which itself represents over 25% of the $279 billion U.S. investment opportunity in energy retrofits.[2] The roadmap outlined here offers a comprehensive issue orientation and flags areas for further research and policy development.

The Small Commercial Energy Retrofit Sector

Defining the Small Commercial Property Market

No universally accepted measure of "small commercial" building size currently exists. The most common delineation for small commercial properties by building size is 50,000 square feet or below. Some research[3] and public policy[4] studies further disaggregate the 50,000 square foot and less grouping into sub groups of under 5,000 square feet, under 10,000 square feet or other divisions, but there is no widely accepted pattern. While building size is the most convenient shorthand, building loan amounts of below $5 million are used to identify "small balance commercial" loans in the secondary mortgage market.[5] Historically this loan amount was the minimum for inclusion in the commercial mortgage-backed securities (CMBS) market.

Small commercial buildings most often are non-core assets, defined as real estate assets that investors consider less likely to be well-leased, well-located or occupied by strong credit tenants. As a result, small commercial buildings typically fall outside the investment parameters of institutional lenders and investors. The non-institutional quality of the small business asset class is the overriding driver for carving "small" properties into a separate asset class.

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[2] Fulton, Mark, et al., *United States Building Energy Efficiency Retrofits, Market Sizing and Financing Models*, DB Climate Change Advisors, Deutsche Bank Group, March 2012, p. 3.

[3] Navigant Research, National Renewable Energy Laboratory, Preservation Green Lab, Lawrence Berkeley National Labs.

[4] PACE energy efficiency financing in different states, energy disclosure laws.

[5] See Boxwood Means, small balance commercial research specialists, http://www.boxwoodmeans.com/.

It should be noted, however, that the small commercial building asset class is large and diffuse, containing numerous, distinct subsets. An understanding of these subsets is crucial to developing appropriate public policy for this asset class in the area of energy efficiency. Subsets of the small commercial building market can be defined by ownership classification (owner-user, owner-tenant, or national franchise, such as chain fast food or drug stores) or by purpose (office, apartment/condominium, retail, small warehouse or industrial, mixed-use or special purpose, such as gas stations or hotels). Further division of the small commercial market that might affect policy design include property age, construction characteristics and market location. Financing and loan limits also sometimes divide the small commercial market. Internal bank lending groups can be restricted by loan amount; for example, loan workflow and underwriting may be based on a maximum loan of $500,000 or $1 million.

One clear example of a distinct carve out within the universe of small commercial properties are those eligible for Small Business Administration (SBA) loans to qualified owner-users. The dominant factors in this group are ownership (at least 51% owner-occupied) and loan size (generally capped at around $5.5 million). Any policy initiatives targeting these properties would need to consider the owner's typically lengthy holding period and an investment motivation that co-mingles business and real estate performance. Other subsets also have unique features that make it impossible to have a single policy solution to encourage "small commercial" retrofits.

Lenders, investors, brokerage companies and owners might each have additional ways to classify small commercial properties. Apartment building professionals might use number of units; some investors might require the property location to be in a top 100 metro area. It behooves policy makers to be alert to these distinctions and to develop programs that are meaningful to market participants wherever possible.

Following is a market overview to begin gaining an understanding of this large and diverse "small" commercial marketplace.

The "Small Commercial" Market Segment is Big

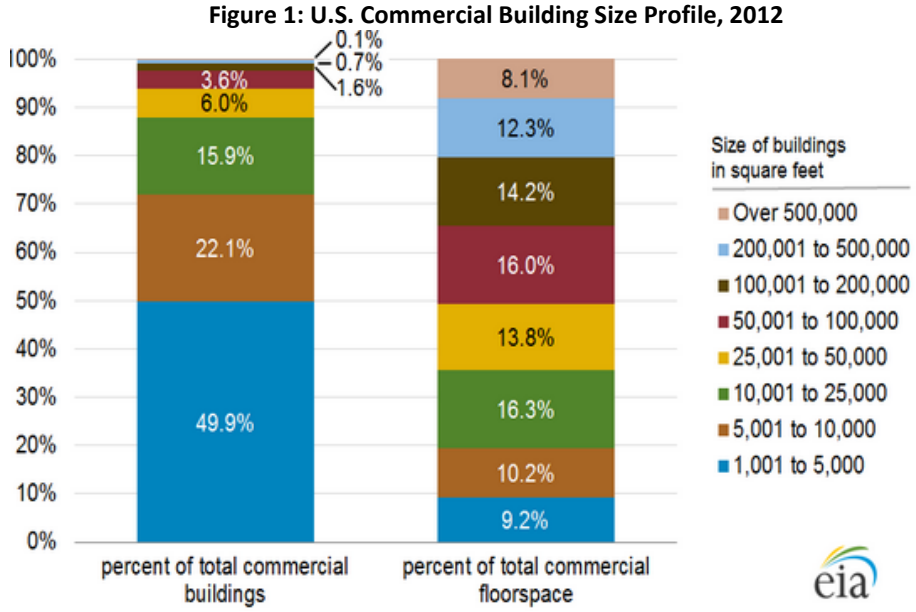
Small commercial properties constitute a substantial portion of the U.S. commercial real estate landscape. As of 2012, the U.S. had 5.6 million commercial buildings comprising 87.4 billion square feet of floor space.[6] While skyscrapers capture the national imagination, America's building stock is comprised predominantly of small buildings. According to preliminary results (Figure 1) from the U.S. Energy Information Administration's (EIA's) 2012 Commercial Building Energy Consumption Survey (CBECS) of U.S. commercial buildings:

- More than 90% (93.9%) of commercial buildings are 50,000 square feet or below.
- Buildings of 50,000 square feet and below account for roughly half (49.5%) of commercial square footage.

[6] Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, http://www.eia.gov/consumption/commercial/reports.cfm.

- 87.9% of commercial buildings measure 25,000 square feet or less, with 36% of total square footage.
- 73% of buildings measure 10,000 square feet or below and represent close to 20% of total floor space.
- The median commercial building size is 5,100 square feet; the mean size is 15,700 square feet.[7]

Figure 1: U.S. Commercial Building Size Profile, 2012



Source: Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, http://www.eia.gov/consumption/commercial/reports.cfm

Small buildings also dominate U.S. rental housing. Seventy percent of the nation's rental housing is in structures with nine or fewer units, and single-family homes constitute almost 40% of the U.S. rental housing stock.[8]

Figure 2, reproduced from a recent Navigant Research study on small and medium-sized commercial buildings, uses 2003 CBECS data to differentiate the commercial real estate market based on building size, and reaches similar conclusions.

[7] Ibid.
[8] Joint Center for Housing Studies of Harvard University, *America's Rental Housing: Evolving Markets and Needs*, Harvard University, 2013, pp. 3-4,

Figure 2: Small and Medium Commercial Building Size Classes

Size Class	SF	Percent SF by Size Class	Percent Buildings by Size Class
Small	< 10,000	20%	73%
Medium	10,000-100,000	34%	25%
Large	> 100,000	46%	2%

(Sources: Navigant Research, U.S. Energy Information Administration)

Noah Goldstein, 2014, "Energy Management in Small and Medium Buildings," Navigant Research

The volume of loans provided to small businesses, including small commercial buildings, also provides a sense of scale for the small business segment. The SBA had an annual volume of $23.74 billion in its two major loan programs, 7(a) ($19.45 billion) and 504 ($4.29 billion) for the fiscal year ending September 2014.[9] The 7(a) program is geared primarily toward business operations, but permitted uses include real estate retrofits, property purchases and equipment upgrades. The 504 program emphasizes the purchase of land and buildings. At the end of fiscal year 2014 the total outstanding SBA commercial real estate loans outstanding total came to just under $115 billion, of which $68.19 billion represented 7(a) loans and $29.86 billion 504 loans.[10] It is important to note that SBA real estate loan volume represents a modest piece of the $160 billion (in 2012) of real estate loans under $5 million signed each year.[11] As this suggests, the small commercial real estate segment is a significant component of the U.S. commercial real estate market, of which a relatively small share (estimated at 15.8% in 2012)[12] comprises the SBA owner-occupied standard. It should be noted, however, that the lion's share of the current small property financing market represents purchases and refinancings, rather than energy retrofits.

Property Type and Occupancy

As noted above, any of the major property types (office, retail, industrial, multifamily, special use) might be a small commercial property. Frequently, more than one use exists within a single structure. A classic small Main Street building type, for example, is retail at street level and residential upstairs, which can complicate investment analysis and the use of policies and programs designed for a single building type/use, and increase lender perception of risk.

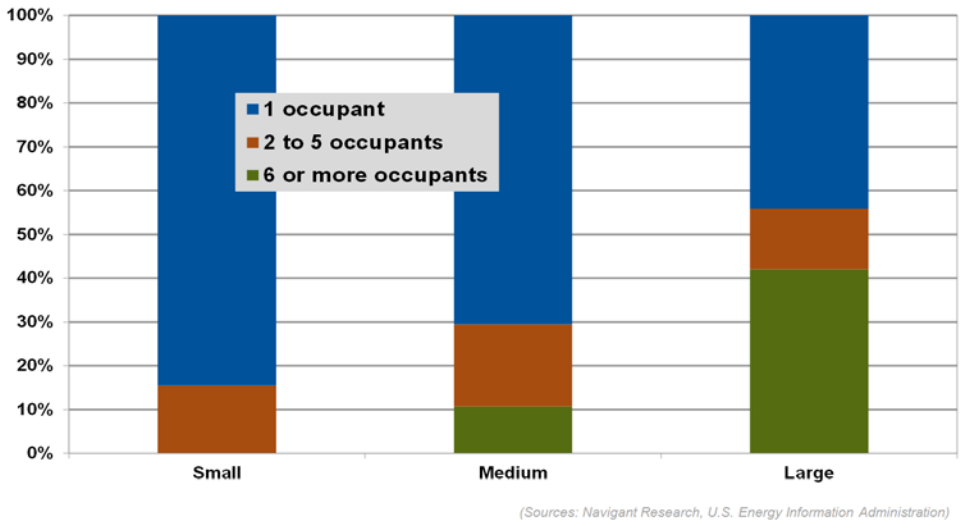
[9] See SBA performance report, http://www.sba.gov/about-sba/sba_performance/performance_budget/small_business_administration_%28sba%29_loan_program_performance.

[10] Ibid.

[11] Boxwood Means, Small Balance Loan Research, National Overview, December 2013, http://www.boxwoodmeans.com/pdf/NationalSummary-3Q2013-Final.pdf.

[12] Estimated on the basis of SBA performance report, http://www.sba.gov/about-sba/sba_performance/performance_budget/small_business_administration_%28sba%29_loan_program_performance and Boxwood Means, Small Balance Loan Research, National Boxwood Means, Small Balance Loan Research, National Overview, December 2013, http://www.boxwoodmeans.com/pdf/NationalSummary-3Q2013-Final.pdf.

Figure 3: Percentage of Occupants per Building by Building Class, 2003



Noah Goldstein, 2014, "Energy Management in Small and Medium Buildings," Navigant

The small commercial property class also is differentiated by its occupancy characteristics. As displayed in Figure 3, Navigant Research's recent work on energy management for small and medium-sized commercial buildings shows that a substantial majority of small (under 10,000 square feet) and medium (10,000 square feet to 100,000 square feet) properties have only one or two occupants. For the small size group, the most frequently encountered occupant is an owner-user or a tenant who has assumed full responsibility for the property via a triple-net lease, which requires the tenant to assume all maintenance, insurance and property tax expenses.

As detailed below, property valuation and risk analysis are more readily performed when occupancy is held by a limited number of tenants. At the same time, consolidation of occupancy across one or two leases concentrates tenant credit and default risk. The creditworthiness of the building occupant is therefore of paramount importance in evaluating the risk associated with investing in or lending to a single-occupant property. Said another way, investment risk profiles are very different for a building occupied by a single, national, credit tenant on a long-term lease versus an identical building occupied by a single, local, non-credit tenant.

Age, Construction Characteristics and Energy Performance

The small commercial property market can also be stratified by age, construction characteristics and energy performance. Much of the commercial building stock is middle-aged, with roughly half built before 1980. In its 2012 preliminary results, CBECS notes that the mean square footage of U.S. commercial buildings has increased steadily since the 1980s, suggesting that smaller buildings are somewhat more likely to be older than newer, larger additions to the building stock.[13]

[13] Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, http://www.eia.gov/consumption/commercial/reports.cfm.

As shown in Figure 4, the 2003 CBECS survey provides the latest available data on commercial building energy consumption by building size.[14] CBECS measures the energy use intensity (EUI) for commercial buildings, defined as the ratio of energy consumption in kBTUs (thousands of British thermal units) per year to property square footage.

Figure 4: Consumption and Gross Energy Intensity by Year Constructed for Non-Mall Buildings, 2003

	Sum of Major Fuel Consumption (trillion Btu)			Total Floorspace of Buildings (million square feet)			Energy Intensity for Sum of Major Fuels (thousand Btu/square foot)		
	1959 or Before	1960 to 1989	1990 to 2003	1959 or Before	1960 to 1989	1990 to 2003	1959 or Before	1960 to 1989	1990 to 2003
All Buildings*	1,488	2,794	1,539	17,685	29,205	17,893	84.1	95.7	86.0
Building Floorspace (Square Feet)									
1,001 to 5,000	191	290	190	2,146	2,805	1,838	89.1	103.5	103.5
5,001 to 10,000	131	231	154	1,972	2,917	1,696	66.2	79.2	91.0
10,001 to 25,000	235	351	191	3,213	4,976	3,346	73.1	70.5	57.0
25,001 to 50,000	172	328	173	2,449	4,128	2,091	70.4	79.4	82.5
50,001 to 100,000	150	380	228	2,060	4,018	2,979	73.0	94.6	76.7
100,001 to 200,000	214	438	281	2,124	3,947	2,993	100.7	111.1	94.0
200,001 to 500,000	219	354	152	2,155	3,427	1,593	101.7	103.2	95.3
Over 500,000	176	421	Q	1,566	2,986	1,357	112.1	141.2	Q

Source: Energy Information Administration, 2003 CBECS Survey, December 2006.

Findings of the 2003 CBECS survey include the following:

- The highest EUI levels are found in structures larger than 100,000 square feet, which are more likely to house data-intensive activities and uses that require high levels of electricity consumption, such as hospitals and supermarkets. (Because a substantial portion of U.S. energy-smart development and retrofit over the past decade has focused on the largest commercial buildings, we suspect that 2012 CBECS energy intensity data may reflect performance improvements for properties larger than 100,000 square feet.)
- Commercial buildings measuring 10,000 square feet or less also have relatively high energy intensities, typically exceeding properties measuring 10,001 to 100,000 square feet. As this suggests, the nation's smallest and largest commercial structures appear to have the most challenging energy intensity records.
- For all building size classifications, properties constructed from 1960 through 1989 tend to consume the most energy (Figure 4). Structures constructed before 1960 more frequently have thick, masonry walls that reduce heating and cooling needs; structures constructed after 1990 are more likely to incorporate energy-saving improvements.

As suggested by the preceding building size and EUI data, important energy savings can be realized from the small commercial property class. Although some segments of the smaller building size group have lower EUI than some larger buildings, substantial savings are possible due to the sheer magnitude of the small commercial market, as detailed below.

[14] 2012 energy consumption data was still being evaluated by EIA as this report was written.

Market conclusions

The small commercial property universe, defined as properties of 50,000 square feet or less, is substantial, accounting for nearly 94 percent of U.S. commercial buildings and roughly half (49.5%) of national commercial square footage.

The small commercial property market is diffuse, stratified by a variety of features, including ownership type, usage, number of occupants, construction characteristics, age, energy performance, location and loan size. The very diversity of the segment, together with its designation as largely "non-core" or below institutional investment grade, has been identified by the general investment community as problematic. If the small commercial building sector were more homogeneous, with lower perceived risk, there would be no need for federally guaranteed loan programs like those offered by the SBA since the Small Business Act was signed by President Eisenhower in 1953.

The good news is that billions of dollars of loans and investments have been made in this sector and are added daily. Additionally, problems tougher than assembling reliable financing for building energy performance enhancements have been cracked before. From the small property sub-set matrix the trick will be to identify the sweet spot where risk-adjusted return for performance upgrades needs the smallest push for the biggest impact. The differentiators listed above should be carefully considered when designing policies intended to encourage building energy performance upgrades, as one size does not fit all.

Energy Retrofit Market Potential and Economic Benefits

According to a 2012 market sizing study conducted by Deutsche Bank, the U.S. energy retrofit market comprises an investment opportunity of approximately $279 billion across the residential, commercial and institutional property markets. Deutsche Bank estimates that these investments could leverage $1 trillion in energy savings over 10 years and create over 3.3 million cumulative job years[15] of employment, based on an assumption of 30% energy savings in buildings built before 1980.[16] Deutsche Bank calculates the commercial share of the market at $72 billion. The size of the market could more than double if a deep retrofit scenario is considered (defined here as over 50% energy savings) and included the many newer buildings (built since 1980) that present significant energy challenges.

[15] Defined as one job for one year.

[16] Fulton, Mark, et al., *United States Building Energy Efficiency Retrofits, Market Sizing and Financing Models*, DB Climate Change Advisors, Deutsche Bank Group, March 2012, pp. 3, 7.

In Figure 5, CFIRE derived an admittedly conservative estimate of the size and impact of the small commercial building energy retrofit opportunity based on Deutsche Bank's commercial market projections. It uses the 2012 findings of the U.S. Energy Information Administration[17] that commercial properties of 50,000 square feet or less (the most frequent definition of small commercial buildings, as discussed previously) constitute 49.5% of commercial property square footage. As discussed, this projection is a conservative one, as the CFIRE estimate excludes deep energy retrofits and properties constructed since 1980. Note, this estimate excludes the $25 billion energy retrofit segment represented by institutional properties (education, health care, worship, public order and safety facilities), which also include numerous small structures that share many of the same financing challenges as small commercial properties.

Figure 5: Estimated Energy Retrofit Market Opportunity

	Total	Commercial Buildings	Small Commercial Buildings[1]
Investment ($billion)	$279	$72	$35.64
Energy Savings (trillion BTUs)	3033	848	419.76
Energy Savings (10 years, $ billion)[2]	1000	$279.6	$138.4
Cumulative Job Years (thousand FTEs)	3305	857	424.2
GHG Reductions (million metric tons CO_2/year)	616	175	86.6

Sources:
Fulton Mark, et al., *United States Building Energy Efficiency Retrofits, Market Sizing and Financing Models*, DB Climate Change Advisors, Deutsche Bank Group, March 2012, pp. 3, 7
U.S. Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, http://www.eia.gov/consumption/commercial/reports.cfm

Notes:
1. Small commercial building share estimated at 49.5% of commercial building share, per 2012 CBECS preliminary results.
2. Commercial energy savings in dollars derived from the ratio of commercial Btu savings to total BTU savings.

Even by this deliberately conservative measure, the small commercial building energy retrofit opportunity is substantial. As shown in Figure 5, the small commercial building energy retrofit market represents over $35 billion in new investment, representing more than $138 billion in energy savings over a decade. These energy retrofits could produce over 424,000 cumulative job years of full-time employment and reduce carbon dioxide emissions by roughly 87 million metric tons per year—the equivalent of the CO_2 produced by 9.74 billion gallons of gasoline.

[17] Energy Information Administration, "2012 CBECS Preliminary Results," June 2014, http://www.eia.gov/consumption/commercial/reports.cfm.

Resiliency is another important economic benefit of building energy retrofits, one with homeland defense implications. Protecting building operations, including the operation of critical facilities, from power interruptions has become urgent due to the increased frequency of extreme weather, the increasing reliance on electricity-dependent technology and grid overloading.

Retrofitting buildings to consume less energy takes pressure off the nation's aging utility grid and should be an important component of national energy independence and homeland security strategies. Building energy management and control systems, coupled with on-site generation, have been successful in keeping businesses and critical facilities operating during power outages. What used to be considered "back-up" power that only ran during an outage is now "resilient power" that is integrated into building, campus and utility systems. Modern energy management and control systems also facilitate the use of demand response programs, which shift energy consumption to off-peak hours, thereby reducing the strain on the electricity grid and generating cost savings for customers.

In sum, the retrofit of small commercial buildings represents a substantial U.S. economic opportunity that would generate significant job creation benefits, deliver important environmental gains, improve business resiliency and cost-effectiveness, and support homeland security objectives.

Market Impediments: Key Barriers to Financing Small Commercial Energy Retrofits

The following discussion examines areas of market resistance to providing energy performance upgrade investment and financing for commercial properties generally, and key impediments for small commercial properties. Challenges to providing capital to this market are numerous and diverse, resulting in lost opportunities to reduce business costs and energy usage throughout the United States. Well-crafted policies are required to address these challenges.

General Market Impediments

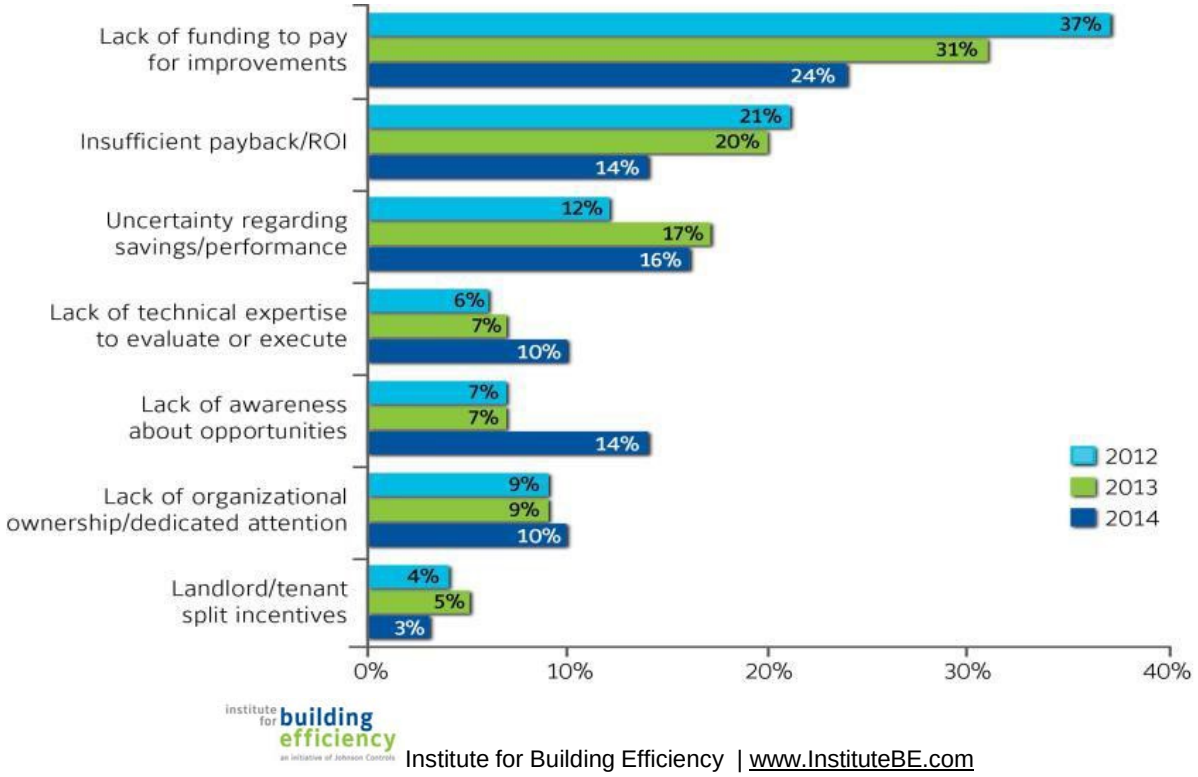
Much has been written about the lackluster level of building energy efficiency investment throughout the U.S. business community, in spite of an opportunity for impressive rates of return.[18] Results from the 2014 North American Energy Efficiency Indicator Survey[19] probe the reasons for this lag. Findings are based on interviews with 687 executives, 25% of whom were located in facilities of less than 50,000 square feet.

[18] According to one recent study, a 28.6% internal rate of return would be generated over a 10-year holding period by installing the highest-performing commercial building energy efficiency investments needed to gain a 30% energy improvement. The payback associated with these investments is estimated at less than four years. See Rhodium Group, *Unlocking American Efficiency: The Economic and Commercial Power of Investing in Energy Efficient Buildings*, United Technologies, May 2013, p. 10, http://naturalleader.com/wp-content/uploads/2013/10/RHG_UnlockingAmericanEfficiency_May2013-v4.pdf.

[19] Institute for Building Efficiency/Johnson Controls, 2014 Energy Efficiency Indicator Survey.

As shown in Figure 6, a constellation of financial, technical, informational and operational concerns are considered the key barriers to business investment in energy efficiency. "Lack of funding" is the most commonly cited barrier to pursuing energy upgrades for commercial properties. Additional financial obstacles include the perception that payback or return on investment is insufficient, and uncertainty concerning savings and performance outcomes. Technical and informational barriers include lack of technical expertise to evaluate or execute energy efficiency upgrades and lack of awareness about energy efficiency upgrade opportunities. Operational barriers include lack of organizational capacity or dedicated attention to evaluating and implementing upgrades, or a perceived inability to align landlord/tenant interests in undertaking energy efficiency improvements (the "split incentive problem").[20] While many barriers have been reduced between 2012 and 2014, the investment confidence gap is still significant.

Figure 6: Barriers to Pursuing Energy Efficiency



[20] Green leases are typically designed to align landlord/tenant interests in undertaking green improvements.

Specific Barriers facing Small Commercial Building Energy Performance Upgrades

The seven key barriers discussed below depress the demand and supply of commercial real estate energy efficiency improvement investment and financing, thereby impeding market development. Most of these barriers are heightened for small commercial properties relative to large ones. Following is a summary of primary factors that could be addressed to increase demand and financing for the energy retrofit of small buildings.

Demand-Side Barriers

1. **Many owners of small properties do not believe pro forma models assessing energy and financial savings of efficiency upgrades.**
   Many property owners just do not "believe" the pro forma, assuming that they will never see the promised return and will be stuck with a loss. This lack of payback confidence is the point of the spear stopping investors from gaining what appears to be a solid return.

   Energy modeling and financial risk analysis are complex and unfamiliar to the owners of small properties, especially as owners in this group have no ready and impartial third party to advise them. Similarly, the threat of loss is too great if the promised returns do not materialize. Behavioral economics research demonstrates that, probabilities of occurrence being equal, the emotional distress of losing one dollar in hand is as compelling as the appeal of an opportunity to make $2 in the future.[21] While the tendency to resist change and to avoid giving something up now for the opportunity of a future gain is universal, the owners of small commercial properties are more likely to be steadfast in this judgment due to the lack of technical expertise and access to substantial financial resources.

   In a similar vein, projections about the future can trigger doubt and property owners are often unsure if they will see the promised repayment or building value increase. While the "simple payback" period (where all invested funds are recovered via energy savings) is an oft used metric, this calculation typically ignores other benefits like lower risk, longer building life and higher market value.

2. **Lack of familiarity with energy performance analysis and technology.**
   Energy and resource reporting and analysis are complicated. Associated tools (software, sensors) are unfamiliar to owners/tenants/managers, triggering perceptions that the risks outweigh the benefits. Determinations of what upgrades to invest in and the cross-cutting effects of bundled efficiency interventions frequently require expert analysis. Building performance technology vendors generally gear their offerings to larger buildings, for which sales are more lucrative. This starves technology advances that specifically meet small commercial property needs as well as the distribution network to deliver the

[21] See R. Thaler, C. Sunstein, *Nudge*, Pg. 33.

solutions. These problems are not limited to the owners, tenants and managers of small buildings, but are more prevalent in the small property sector.

3. **Lack of operational management sophistication.**
   High-performance buildings sometimes require a level of operations management beyond what is available to owners. Hiring a sophisticated manager or retraining existing property staff might be too expensive for small buildings to justify. Owner-occupied buildings might not have a dedicated operations manager and the person with that responsibility might have other business-related tasks of higher priority.

4. **Owners/borrowers are frequently of lower credit quality, with limited cash or access to debt.**
   This limitation is more inherent in the owner profile than a characteristic of a performance upgrade. Poor credit quality and limited resources is a frequent source of credit denial when banks meet their "prudent, safe and sound" lending requirements. While not unique to small commercial owners and borrowers, credit constraints tend to be more prevalent in this group. As a result, small building owners often have a "repair as needed" mentality. By contrast, larger properties and portfolios are more likely to have defined capital expenditure (CapEx) accounts and planned replacement schedules. Ready capital budgets and replacement schedules put larger properties at an advantage in the implementation of energy efficiency improvements.

Supply-Side Barriers

1. **Properties are often complex, mixed-use or otherwise atypical, and are therefore more difficult for lenders or investors to underwrite**. Defining loan risk is easiest with simple, standardized collateral—frequently the opposite characteristics of small commercial properties. Older, mixed-use projects with atypical uses or construction tend to complicate appraisal and risk analysis. Smaller commercial properties are more likely to fall in this group than larger, investment grade properties.

   The investment risk increases with project complexity and limited market activity level/location, with many variations between the lowest core property risks to the highest. Risk variations can be demonstrated by considering the two properties described in Figure 7.

Figure 7: Property Configurations and Risk Profiles

Lowest-Risk Property Configuration	Highest-Risk Property Configuration
• A single building of conforming/typical design and size • Improvements in average or better condition • On a single, fully useable land tax parcel • Occupied by a credit-worthy single user (owner or tenant) • Located in a market with good sale velocity (for that kind of building).	• Configured for multiple occupants/tenants • Occupied by tenants of mixed or low credit quality • Improved for multiple uses (retail + apartment + warehouse) • Atypical size, access, building configuration • Improvements with deferred maintenance, sub-average condition • Located on multiple land tax parcels (with perhaps extra land) • Located in a rural, thinly traded unstable market

Typically, properties with higher investment risk constitute poorer quality loan collateral. Because small commercial properties, as a class, represent higher risk/lower collateral quality, they are less likely to attract financing.

2. **Loans have a hybrid character, combining the features of construction and permanent loans.** Energy retrofit loans include a higher risk construction period, during which the energy efficiency features are installed and energy savings are prospective, followed by a lower-risk period following the completion of the improvements and the realization of energy savings. The hybrid nature of energy retrofit loans heighten lender risk perceptions, especially for smaller commercial properties that are more likely to be non-standardized and whose borrowers more frequently present credit challenges.

3. **Upfront transaction costs and ongoing management costs are high relative to the loan/investment amount.**
   The decision to make a loan or an investment requires a variety of upfront transaction costs, and some of that overhead is fixed. Costs, such as legal, energy audit, lender fees and the appraisal, are affected by deal size but represent a much higher proportion for smaller deals than larger ones. This gives the advantage to larger deals where the fees do not represent such a substantial part of the transaction.

It should be noted that the secondary market for pools of real estate loans aggregated as securities profoundly influences how investors and financial institutions view property risk. The rating agency's risk analysis and conclusions provide powerful direction to shaping the capital market for any property type, including small commercial property. As a mechanism for increasing energy retrofit loan capital and attaining the lowest cost of funds, securitizations should be considered a probable end game, so that rating agencies and issuing investment banks, buyers and regulators can develop sound data, analysis and structuring requirements. Securitization is an especially useful strategy for growing the capital available for the energy retrofit of small commercial property because it is a catalyst for risk diversification and the standardization of underwriting, both of which are barriers to the provision of capital for small commercial properties.

The demand- and supply-side barriers suggest that the difficulty and uncertainty involved in determining what to do (which retrofit measures to implement), how to do it (who should execute), and how to finance are a steep barrier for residential and small commercial building owners. Adoption of energy efficiency retrofits has remained very low, even in programs with substantial investment in information, tools and other support. Wide-scale adoption of energy efficiency investment in smaller properties likely requires a turn-key program that addresses all aspects of the execution. Building owners must still be motivated to investigate such programs, but the turn-key approach can overcome many of the barriers identified above.

The diversity of the financing barriers listed above and the need to build a sound secondary market indicates that a combination of solutions should be developed to facilitate the financing of energy efficiency improvements. The following section presents solutions that are under consideration, are being tested or have already been established.

What's Working: An Overview of Current Efforts Supporting Building Performance Upgrades

Building energy-related retrofit finance is an emerging sector of the finance market. In the last few years, numerous financing programs have begun, and many more promising sources and structures are emerging. However, despite progress and the growing availability of financing options, adoption of energy efficiency and renewable investment in buildings remains relatively low, particularly in the small buildings sector.

Part of the adoption problem is the limited deployment of capital, given the size of the market. As discussed previously, the national energy retrofit market has been estimated at $279 billion (based upon an assumption of 30% energy savings in buildings built before 1980), with commercial buildings accounting for $72 billion of this amount.[22] CFIRE estimates the small commercial building sector accounts for approximately half of the potential commercial market, or $35.6 billion (based on building square footage). The size of the market would more than double if a deep retrofit scenario is considered (defined here as over 50% energy savings) and included the many newer buildings (built since 1980) that have significant energy challenges.

Despite this substantial market opportunity, private banks, life insurance companies and other private financing entities have not yet emerged as direct "risk-based" lenders in the small building retrofit market. Government and utility-sponsored or supported programs provide tax and regulatory incentives, provide loan funds and/or credit support, and fund databases and research to support financing, but have not been able to supply the volume of capital needed.

[22] *United States Building Energy Efficiency Retrofits, Market Sizing and Financing Models*, DB Climate Change Advisors, Deutsche Bank Group, March 2012.

What has worked, and has the potential to scale much larger in the future for small building retrofits, are public-private ventures. Most successful programs involve both government and the private sector. Governments and utilities sponsor/support energy retrofit programs for small commercial and residential projects, while private banks and other institutions provide capital, structuring, and administrative support. Private-sector service and product providers work closely with both sectors to smooth execution and management. Public-private ventures have the potential to substantially leverage private investment with public capital, overcoming some of the capital availability issues.

Private-sector financial institutions are also working independently of public-private partnerships to develop energy-related debt and equity funds and other financing solutions. These efforts are sorely needed to generate the level of capital necessary to significantly improve the performance of the building stock.

In order to serve the small building market, specific actions are required:

- First, government and the private sector need to continue to work together;
- Simple (on their face) "turnkey" programs need to be developed and refined;
- Underwriting and program execution needs to improve;
- Contractor-led programs need to be encouraged and structured to protect borrowers and service providers;
- Larger pooled financing structures need to be expanded, with intelligent management of the transition from the more risky "construction" risk period, during which a retrofit is executed, and the low risk period after a retrofit is seasoned and energy cost savings are known.

The foundation of all progress in the building retrofit market is a high level of borrower demand. As discussed, borrower demand to date has been limited, and more effort needs to be made in communicating the "value" of performance-related investment. This effort is particularly important since internal capital budgets (41%) and internal operating budgets (54%) are by far the largest source of capital for energy efficiency investment.[23] This sentiment was clearly stated in a recent study of lender energy efficiency finance:

> "By far the greatest obstacle identified by participants (banks) is a lack of customers actively seeking financing for energy efficiency investments. Lenders shy away from the energy efficiency market because they remain unconvinced that there is sufficient demand to justify their investment. One lender noted that in the commercial market, in particular, building owners, managers, and tenants need to be sold on the value of energy efficiency as an investment."[24]

[23] *Energy Efficiency Indicator Results*, Johnson Controls, Institute for Building Efficiency, 2014.

[24] *Engaging Small to Mid-Size Lenders in the Market for Energy Efficiency Investment: Lessons Learned from the ACEEE Small Lender Energy Efficiency Convening (SLEEC)*, Casey J. Bell and Virginia Hewitt, ACEEE; Angela Ferrante, Energi, Inc., February 2014.

The rest of this section describes some of the key retrofit financing programs/sources and how they are positioned relative to serving the small building market.

Property Assessed Clean Energy (PACE)

PACE, a financing mechanism where local governments or designated financial institutions provide loan capital, that is paid back by property tax assessments on improvements, is an emerging success story for small retrofit and renewables projects. The PACE mechanism, which improves loan security by collecting loan payments through the property tax bill and imposing a tax lien if the loan is not repaid, is highly accessible to small borrowers, including smaller commercial property owners.

As of June 2014, over 250 projects have closed worth $75 million, 73% of which have been for small buildings of less than 50,000 square feet, and 83% of all loans have been below $300,000. Volume has doubled in each of the last two years and $250 million in projects are in the pipeline in nearly 500 communities nationwide.[25] The industry benefits from an active national organization, PACENow.org, for advocacy and sharing best practices.

PACE has significant promise for small retrofits, but progress still needs to be made in a number of areas. Uptake by borrowers has been low because borrowers do not fully understand the "value" of a retrofit and are concerned about financial risk. Transaction costs, including the time it takes to close loan transactions, program fees (in some cases) and underwriting complexity, remain high. Small project support structures, including both fully turnkey programs and contractor-driven models need to be encouraged.

Utility On-Bill Pay and Finance

Utility on-bill payment and financing programs enable repayment of financing for energy-related improvements on consumer or business utility bills. Because utility on-bill payment and financing programs will result in utility shut-off if the loan goes into default, these programs improve the security of energy retrofit loans, including those for small commercial properties.

Utility on-bill payment programs have been successful, with over $1.8 billion of financing closed ($775 million non-residential) in 30 North American programs. Five top programs have been responsible for 90% of the financing. These programs have worked for small properties, with loans averaging $5,787 for residential and $15,400 for the eight commercial programs, and median default rates of 0.9%. The average loan size over the program lifetime ranged from about $2,200 to $8,000 for the four non-residential programs that target small business consumers and $32,000 to $127,000 for the three other nonresidential programs that also allow large commercial and institutional consumers to participate.[26]

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[25] *Setting the PACE 2.0, Financing Commercial Retrofits*, Institute for Building Efficiency, Johnson Controls, May 2014.

[26] *Financing Energy Improvements on Utility Bills: Market Update and Key Program Design Considerations for Policymakers and Administrators*. Financing Solutions Working Group, State & Local Energy Efficiency Action Network, May 2014.

Utility on-bill financing programs have even greater potential. To date, the vast majority of financing has been provided by utility ratepayers, shareholders or taxpayers, and even the $1.8 billion financed pales in comparison to the $279 billion U.S. market for energy retrofits. New programs in Hawaii and Oregon, and those being planned in numerous other states, are integrating private financing into the mix—increasing the potential and political support for the program substantially.

Government and Utility Programs

Unlike traditional debt from banks, life insurance companies[27] or commercial mortgage-backed securities (CMBS) conduit lenders[28], the sustainable/energy retrofit debt markets have typically evolved around utility, local, state or federal subsidies and sponsorship. A study by Resources for the Future identified 206 government and utility-related energy efficiency financing programs on the books in 2011, over 150 of which covered commercial properties.[29] These programs offered various credit enhancements such as loan loss reserves, loan guarantees and interest-rate buy downs, as well as direct lending using revolving loan funds. In most cases, the amount of debt financing is limited by the requirement that annual energy cost savings cover the debt service cost of the energy loan. This requirement that the Savings to Investment Ratio (SIR) of energy enhancements be greater than one is a common requirement in public and utility building upgrade programs.[30]

Small Business Administration

Federal incentives for building energy retrofits are primarily focused on tax credits and deductions, but a number of programs applicable to small building retrofits are available from SBA. These programs, Section 7(a) and CDC/504, provide federal credit enhancements to improve loan security and generate private financing, and can be used to finance energy efficiency and on-site renewable energy.[31] While the 7(a) and CDC/504 programs are not used frequently for energy upgrades, they have generated commercial real estate loans of close to $300 billion through the fourth quarter of 2013.

The SBA CDC/504 program can help small businesses expand by supporting fixed-asset financing for land, real estate and equipment acquisition, construction and renovation, including energy efficiency upgrades. The program provides credit enhancements to ensure loan repayment, and is typically executed by local banks and Community Development Financial Institutions (CDFIs).

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[27] Life insurance companies are active in the issuance of commercial real estate loans, and are purchasers of commercial mortgage backed securities (CMBS), another significant source of commercial real estate financing.

[28] Conduit lenders aggregate large numbers of small commercial mortgages purchased from third-party originating lenders and pooled as commercial mortgage backed securities; bonds that are then sold to investors. By contrast, "large loans" are securitizations consisting of one or a small number of securitized loans. Portfolio loans are loans originated and held by the originating lender.

[29] *Borrowing to Save, An Assessment of Energy Efficiency Financing Programs*, Resources for the Future, April 2012.

[30] See, for example, Connecticut's PACE program guidelines, in Connecticut Clean Energy Finance and Investment Authority, C-PACE Program Guidelines, Version 3, September 9. 2013, p. 8.

[31] General Small Business Loans: 7(a) see: http://www.sba.gov/content/use-7a-loan-proceeds; Real Estate and Equipment Loans: CDC/504 see http://www.sba.gov/content/use-cdc504-loan-proceeds.

The SBA's 7(a) program supports the provision of working capital loans to small businesses by providing federal loan guarantees of up to 75% of the loan amount. Loans are evaluated on the basis of the borrower's credit worth, including business history and prospects. SBA 7(a) loan proceeds can be used for construction, renovation, leasehold improvements and the acquisition of machinery and equipment. This means eligible small businesses can use the loan to purchase ENERGY STAR and other energy-efficient equipment and lighting fixtures, or to retrofit an existing facility or even purchase land, or construct or renovate a building.

The SBA 7(a) program has been used infrequently for energy efficiency upgrades. Some banks are looking more closely at this program and how SBA might expand its program to include more energy financing.

Other Federal Programs

The Department of Energy (DOE), through the Office of Energy Efficiency and Renewable Energy (EERE), funds research, educates and supports building performance research for small commercial properties. Specific initiatives targeting the small commercial property market are underway, in particular with the National Renewable Energy Lab (NREL). Within DOE, there is a recognition that small commercial property is the last large property group that still needs assistance to overcome market barriers to catch up with larger, better-funded and managed property. Additional funding for EERE to continue this effort would flow directly into small commercial sector progress.

The ENERGY STAR program,[32] run jointly by DOE and the U.S. Environmental Protection Agency (EPA), helps the private sector to develop building energy efficiency products and services, and has developed online technology and a building rating system to guide energy retrofits. EIA's CBECS[33] provides the key foundational data necessary to profile energy use for the U.S. commercial property sector, including small buildings. CBECS data underpins the development of energy consumption models, the key building blocks to designing effective energy retrofits.

Federal tax incentives can help to offset the costs of commercial energy retrofits. These incentives are particularly useful in enhancing the affordability of small commercial energy retrofits, to offset upfront costs and to help cash-pressed borrowers:

- The investment tax credit for renewable energy installations (30% for solar, fuel cells and small wind; 10% for geothermal, microturbines and combined heat and power), remains in force through December 31, 2016.[34]
- The Section 179 (D) tax deduction for commercial building energy efficiency expired on December 31, 2013. Numerous energy efficiency organizations have proposed extending the deduction through at least 2015; raising the maximum deduction from $1.80 to $3.00 per square foot; and making the deduction more efficient by linking it to

[32] http://www.energystar.gov/buildings?s=mega.
[33] http://www.eia.gov/consumption/commercial/.
[34] http://www.cl-p.com/downloads/Energy%20Efficiency%20Renewable%20Tax%20Incentives.pdf?id=4294986876&dl=t.

verified energy savings and increasing the deduction amount as verified energy savings increase.[35]

- Depreciation schedules for many energy efficient building systems run for 39 years; many have suggested that depreciation be aligned with the useful life for the component, frequently 15-25 years, to incentivize purchase and installation.[36]

Private Financial Institutions

Private banks and financing sources have been actively involved in PACE financing, energy performance contracts, services agreements, SBA Programs, CDFIs, and most other financing options, providing capital, structuring and administrative services. They can and will continue to be very important partners in retrofit finance. However, the private banking and insurance sector has yet to emerge as a direct "risk-based" lender in the small building retrofit market. Small loan size, hybrid construction/permanent loan characteristics, poor security, underwriting complexity, transaction costs, and risk-based capital rules have limited banks from any meaningful direct role. To put it more simply, private banks cannot yet make sufficient money on a loan-by-loan basis to justify the risks taken.

Private financial institutions may have the most potential to scale and transform the retrofit finance market by integrating performance-based retrofit finance within their normal mortgage and refinance lending programs. Given growing recognition of the value created by energy retrofits, such integration could increase collateral values and limit default risk. Such change will require education of financial institutions and borrowers and legal work to address mortgage and related securities documentation.

Equipment Loans/Leasing

Equipment loans or capital leases,[37] which are treated like debt on the balance sheet, have been available for many years for larger companies and equipment/systems purchases. More recently, some lease companies have been serving smaller retrofit/equipment markets. In addition, SBA guarantees are often available for smaller loans, improving the economics for smaller equipment purchases. These loans are available through banks, private capital sources or leasing companies, and vendors (original equipment manufacturers). For deep, integrated whole building energy solutions requiring multiple interventions, this financing can potentially be part of the solution, but not the full answer. There are also other issues with this type of financing, including uncertainty regarding the continuation of off-balance sheet financing treatment.[38]

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[35] http://www.hpbccc.org/policies/HPBCCC-Policy-Cmte_Tax-Priorities_v-2014-03-10.pdf; https://www.ase.org/sites/ase.org/files/resources/Media%20browser/fact_sheet_-_extend_tax_incentives_for_energy_efficiency.docx.

[36] http://www.hpbccc.org/policies/HPBCCC-Policy-Cmte_Tax-Priorities_v-2014-03-10.pdf.

[37] Capital leases transfer ownership of the leased equipment to the borrower at the end of the lease term. Operating leases return the leased equipment to the lender at the end of the lease term.

[38] *Local Governments Role in Energy Project Financing, A Guide to Financing Tools for the Commercial Real Estate Sector*, IMT, MIT CoLab, March 2014.

Contractor Based Financing/Execution

While there are inherent issues of conflict and performance, financing approaches, which rely upon a master "contractor" that is also the source for financing, make a lot of sense for smaller building retrofits. Service providers that design and execute retrofits are currently involved in all types of financing schemes. One example of such financing was recently announced by Joule Assets, which has arranged strategic financing partnerships for 10 U.S.-based energy efficiency contracting firms, with a total pipeline projected at $270 million, of which Joule Assets will undertake an initial $90 million deployment.[39] The benefit to contractors is that such project financing enables small- to mid-sized contractors to offer in-house financing, significantly shortening sales cycles and extending their project pipelines. Other companies like Noesis and Kilowatt Financial have related approaches and more are expected to emerge as private capital sources seek partners to source energy efficiency investment opportunities.

Managed Energy Service Agreements

Managed Energy Service Agreements (MESAs) are contracts under which a third-party energy efficiency contractor assumes the energy management of a client's facility, including the installation of energy efficiency upgrades and responsibility for utility bills, in exchange for a series of payments based on the customer's historic energy use. (Note that MESAs do not control for energy price risk.) The MESA contract in effect caps the customer's usage-based payments, while the contractor reaps all or part of the energy savings over the contract term. When the contract concludes, the customer inherits installed energy savings equipment and the lower energy bill.

MESAs offer promise for small commercial energy retrofits in cases in which the property owner is financially stable, but lacks the expertise or interest to undertake the energy efficiency retrofit. MESAs offer a turn-key energy retrofit and financing approach. Because MESAs are executed under a service contract they can be passed on to tenants as operating expenses and do not require the approval of a property's mortgage lenders.

While MESAs minimize upfront costs to the customer, they can entail significant upfront costs for contract negotiation, energy modeling and energy audit. For this reason, MESAs are typically reserved for projects measuring 250,000 square feet or above. The use of MESAs in the small commercial property market would be enhanced if projects could be aggregated for financing and contracts and energy assessments standardized. Such aggregation and standardization could be performed under the auspices of state or local agencies. The New York City Energy Efficiency Corporation has developed an Energy Service Agreement program[40] to provide energy upgrades to property owners. The use of subsidies, including tax credits or deductions, to offset upfront costs could also help to expand the use of MESAs in the small commercial energy retrofit market.

[39] Joule Assets Targets $ 90 million for Energy Contractors, Triple Pundit, June 24th, 2014.
[40] New York City Energy Efficiency Corporation, "Energy Service Agreements," http://www.nyceec.com/esa/.

Energy Service Companies

Larger energy services companies (ESCOs) typically bundle energy efficiency services for substantial, credit-worthy customers, including the federal government, under long-term contracts. Improvements are repaid, inclusive of the ESCO's profit, from utility savings. The aggregation of smaller projects under a local turnkey program could facilitate the use of ESCO contracts for the small commercial market. An innovative ESCO-based program proposed by the Vermont Energy Investment Corporation in 2013 establishes local programs to provide energy retrofit services to properties, especially small buildings that house municipal and state services, health care facilities and affordable dwellings through public purpose energy service companies (PPESCOs).[41]

Energy Efficiency and Renewable REITs

Real Estate Investment Trusts (REITs) have become a worldwide market valued at over $1 trillion, providing a liquid "stock-like" investment that both institutions and individuals can access. For many years, the REIT structure, due to many technical/legal requirements, was not considered as a source of building energy efficiency capital. However, in April 2013, Hannon Armstrong obtained Internal Revenue Service (IRS) approval for a proposed mortgage REIT (58% energy efficiency projects) under a private letter ruling.[42] The Department of the Treasury and IRS issued rules and guidance on REITs in May 2014. They recognized the opportunities for REITs, but with many limitations. Analysts in comments support a return of the REIT definition of real property to one focused on a physical rather than a functional definition. This approach would expand REIT coverage to wider classes of energy property.

Mortgage REITs therefore have potential for the future, but given the complexity and cost of maintaining REIT status, in addition to the economics of generating sufficiently attractive returns for REIT investors, using a REIT structure would likely make the most sense for a large aggregation of energy-efficiency-related, qualifying assets.[43] While an exciting future option for larger properties, they are less likely to serve as a source of capital for small building retrofits.

REITs also have the ability to issue corporate bonds for sustainability investment. In June 2014, Vornado Realty issued a five-year $450 million "green" bond to invest in energy efficiency and sustainability. Regency Centres issued the first "green" bond in late 2013.[44] These REIT "green" bonds are in addition to the $14 billion (2013) "green" bond market for clean energy, which is projected to grow to $40 billion in 2014 and to over $100 billion by 2015.[45] "Green" bonds have been used predominantly for larger projects; they are less likely to serve as a source of capital for small projects. It should be noted, however, that "green bonds" could be used to finance

[41] Vermont Energy Investment Corporation, Deep Energy Retrofits: The PPESCO Model, December 2013, http://ppescohowto.org/resources/PPESCO-Deep-Energy%20Savings.pdf.
[42] http://www.akingump.com/en/experience/practices/global-project-finance/tax-equity-telegraph/solar-reit-qualification-a-long-putt-1.html.
[43] *Innovations and Opportunities in Energy Efficiency Finance*, Wilson Sonsini Goodrich & Rosati, May 2014.
[44] "Vornado Realty $450 m, 5-yr BBB green property bond kicks along in US market; but we need more ambition to help fix climate," Climate Bonds Initiative website, article posted June 22, 2014.
[45] "Green Bonds Show Path to $1 Trillion Market for Climate," *Bloomberg BusinessWeek*, June 26th, 2014.

the growth of energy services contractors and other organizations that finance or perform energy upgrades for small commercial properties. It is also possible that "green" bonds could be used to finance state, local and utility programs for building energy efficiency upgrades, including those for small properties.

Conclusions

The preceding review seeks to illuminate key elements for consideration by policy makers seeking to improve the energy efficiency of small commercial buildings and, in so doing, strengthen small businesses, create jobs and enhance the nation's economic resiliency and energy security.

Key findings are the following:

1. Small commercial buildings, by virtue of their prevalence in the U.S. commercial landscape, exert a key influence in meeting the nation's energy efficiency goals.
    a. Almost 94 percent (93.9%) of U.S. commercial properties are small buildings, defined as structures of 50,000 square feet and below. These properties account for roughly half (49.5%) of U.S. commercial square footage.
    b. Almost nine of ten U.S. commercial properties (87.9%) measure 25,000 square feet or less, and represent 36% of commercial square footage.
    c. Close to three-quarters (73%) of U.S. commercial buildings are very small at 10,000 square feet or below, and account for close to 20% of the nation's commercial floor space.
    d. The median commercial building size is only 5,100 square feet; the mean size is 15,700 square feet.
2. CFIRE conservatively estimates the small building retrofit market at $35.6 billion, based on 30% energy savings and retrofits restricted to buildings constructed by 1980. Energy retrofits for this market could produce over 424,000 job years of full-time employment, reduce greenhouse gas emissions by 87 million metric tons per year, and help to enhance business resilience and the security of the U.S. electric grid.
3. The small commercial property market is notably diverse. Market subgroups have formed based on market and regulatory forces. Efficient policy will respect these divisions.
4. Small commercial buildings are typically considered less likely to be well-leased, well-located or occupied by strong credit tenants. As a result, small commercial buildings typically fall outside the investment parameters of institutional lenders and investors, making it more difficult to supply energy retrofit capital to this asset class.
5. Additional demand and supply barriers further restrict the flow of capital to the small commercial building energy retrofit sector.
    a. On the demand side, the owners, managers and tenants of small commercial buildings are frequently skeptical that energy savings will materialize; often do not understand energy performance analysis and technology; lack the operational sophistication to manage energy upgrades; and are often of lower credit quality with

more restricted access to cash or debt. These factors depress demand for energy efficiency loans in the small commercial sector.

   b. On the supply side, small commercial properties are frequently difficult to underwrite due to complex or atypical configurations, uses and market characteristics. In addition, energy efficiency loans are a hybrid loan product, combining the characteristics of construction and permanent loans, thereby making it more difficult for lenders to evaluate and price risk. As well, fixed upfront transaction (legal, energy audit, financing fees and appraisal) and ongoing loan management costs represent a larger component of the loan/investment amount, thereby rendering these transactions less attractive to investors and lenders.

6. Despite market barriers, there have been some successes in the small commercial financing market for energy retrofits. What has worked, and has the potential to scale much larger in the future for small building retrofits, are public-private ventures. These include:
   a. Local and state PACE programs; and utility on-bill pay and financing programs. The collection procedures (collection is through the property tax bill or the utility bill) and sanctions (default results in a tax lien or shut off of utility service) associated with these programs enhance loan security. The aggregation of small business applicants and the standardization of application, energy audit and legal requirements and the vetting of eligible contractors reduces transaction costs and loan risks. Programs have been capitalized by a variety of mechanisms, including government and foundation grants, and the participation of private financial institutions. Private sector financial participation is crucial to growing these programs.
   b. In a similar vein, 206 government and utility-related energy efficiency financing programs existed in 2011, over 150 of which covered commercial properties.[46] These programs offered various credit enhancements such as loan loss reserves, loan guarantees, and interest-rate buy downs, and direct lending using revolving loan funds. Public and utility participation can help to stimulate customer demand, standardize procedures and provide credit support to increase the flow of private capital to the small commercial building sector.
   c. The Small Business Administration's 504/CDC credit enhancement program to support fixed asset borrowing and 7(a) loan guarantee program for working capital loans have been infrequently used for energy retrofit loans, but provide an excellent platform for scalable efforts. The SBA model leverages federal credit support to induce private lending to small businesses. Since inception, the 504/CDC and 7(a) programs have provided some $300 billion in real estate financing to the small business sector.
7. Securitization—provided that sound underwriting, credit assessment, structuring and rating protocols are adopted and followed—offers a potentially effective path to providing energy efficiency financing for small commercial buildings at least cost. The use of securitization can accelerate the market adoption of best practices for transaction underwriting and legal

[46] *Borrowing to Save, An Assessment of Energy Efficiency Financing Programs*, Resources for the Future, April 2012.

standards. Programs to encourage the financing of small commercial energy retrofits should be designed with an eye toward an eventual securitized market.

8. Key supportive programs for the growth of the small energy retrofit market are managed by DOE, EPA and EIA. These programs include research, program development and technical assistance programs beneficial to the small commercial building retrofit sector and are administered by DOE (EERE initiatives), DOE and EPA (ENERGY STAR) and the EIA (CBECS). Similarly, federal tax incentives supporting building energy efficiency, including tax credits for renewable energy installations, depreciation schedules and the former Section 179 (D) tax deduction for commercial building energy efficiency expenditures, can help motivate small building owners to undertake energy efficiency upgrades by offsetting first costs and helping to overcome cash limitations.

Policy Recommendations

Policy recommendations supported by our findings are detailed below.

1. **Federal programs, which offer important support for the growth of the small energy retrofit market, should be expanded and deployed to facilitate state and local energy retrofit financing efforts.**
    a. Expand existing research, program development and technical assistance programs including CBECS, DOE's EERE initiatives and ENERGY STAR which provide cost-effective approaches to market expansion.
    b. The federal government is well-positioned to support research and deployment of building performance tracking, reporting, analysis and control software and hardware. The energy retrofit market will grow with the increasing availability of inexpensive, easy to install meters; sensors; cloud based building management systems; and public display of building energy performance data (cost and intensity).
    c. More directly, federal credit enhancements and guarantees, such as those offered under SBA's 7(a) and 504/CDC programs, are a potent and well-tested way to attract substantial additional private financing to the small commercial building retrofit market. A program that combines the small business financing expertise of the SBA and the energy efficiency technical support of DOE would be ideal.
    d. Comprehensive building energy efficiency measures should be considered by Congress in forthcoming tax reform packages. Although tax credits for renewable energy equipment installations remain in force through 2016, the principal federal tax incentive encouraging commercial building energy efficiency, Section 179 (D), expired at the end of 2013.
        i. The comprehensive evaluation and improvement of tax incentives for commercial building retrofits can help to overcome market barriers to the provision of private financing for small commercial buildings.
        ii. Tax incentives should be performance-based, linked to measurable improvements in building energy efficiency.

iii. Tax incentives might be structured to encourage the use of slower payback measures that nonetheless deliver substantial efficiency gains, such as the installation of energy efficient windows and doors.

2. **Federal policy should encourage the development and testing of energy retrofit programs at the individual city, county or utility level.** Local initiatives are less risky than larger state, regional and national programs and can provide proof of concept for larger programs. State, local and utility officials and organizations can help to identify local program opportunities and provide technical support at the community level.
3. **Public-private energy retrofit programs should be encouraged in federal policy making.** To date, public-private ventures have been the most successful model for delivering energy retrofit financing to the small commercial building sector and have demonstrated the most potential to scale. Key elements of a successful public-private venture can include:
    a. Leveraging of public credit enhancements (loan loss reserves, guarantees or other financial support), superior collection methods (debt collection through tax or utility bills) and sanctions (tax liens or utility shutoffs) to improve loan security and leverage significant private capital flows.
    b. Use of standardized administrative processes, legal documents and contractor training requirements to improve efficiency and reduce upfront costs.
    c. Bundling of utility, federal, state and local tax incentives to offset project costs.
    d. Aggregation of small projects into larger contracts to introduce scale economies.
    e. Delivery of turnkey solutions to ensure that retrofits are implemented completely, efficiently and effectively.
    f. Promotion of cost-effective and readily deployed and replicated energy conservation measures, such as lighting improvements; inexpensive, web-enabled building system controls; benchmarking software; and heating oil to natural gas conversions to drive rapidly realized savings.
4. **Federal, state and community policy makers should recognize local and property-level variations in designing energy efficiency programs that serve small businesses and others.**
    a. Policy initiatives might be most appropriately focused where energy costs are highest. These markets have a natural economic incentive to improve performance.
    b. The most energy-inefficient buildings may have the strongest incentive to improve performance.
5. **Policy makers should leverage national CBECS data and the growing quantity of voluntary and mandatory benchmarking and disclosure programs to create more meaningful building performance databases**. Better collection and dissemination of energy consumption and benchmarking data will support the design of more meaningful energy models and help owners, tenants, buyers, sellers, appraisers and banks evaluate the performance of specific buildings.
6. **Utilities should be required to provide energy consumption data to property owners and tenants to educate customers and facilitate energy retrofits, including aggregate building level data for properties in which tenants are separately metered.** Customer education is a key aspect of driving energy retrofit demand. The owners, managers and tenants of small buildings are especially in need of such education, as strived for by the “Green Button”

initiative.[47] The monthly utility bill and the customer's utility records can supply the key metrics.

a. Utilities should be required to provide building owners with their energy consumption data in usage (kWh, kBTU) and dollars. Customers should also be provided with instructions on converting this data into standardized metrics based on square footage occupied. If tenants in leased buildings are separately metered, the utility should be required to provide the building owner with aggregated data on building energy usage to facilitate building-wide retrofits.
b. Every utility bill or aggregation of building energy usage should prominently include the average $/kWh electricity cost per year and the $/therm natural gas. Monthly usage records should also be aggregated in the customer's account for ready access by property owners, tenants and their energy managers to make energy audits easier to conduct and to educate building owners.
c. Publicly supported energy efficiency programs should educate small businesses and the owners, managers and tenants of small buildings about the economic benefits of energy retrofits and the appropriate measurement of energy savings. Policy makers should also be educated on this subject.
    i. Customers should be sensitized to the use of life-cycle costing analysis, already widely in use across the federal government, which measures the costs and savings of an energy efficiency program over the equipment life cycle and takes into account long-lived maintenance and operations costs as well as upfront expenditures to produce the least cost outcome.
    ii. Customers should also be educated to understand the investment interplay of fast payback energy conservation measures like lighting, generation (like tax-supported solar) and slow payback items (like windows and HVAC). The combination of fast and slow payback items in a single project can simultaneously achieve acceptable financial returns and significant energy savings.
    iii. Customers and policy makers should be aware that value can extend beyond cost savings. Reduced risk, health and productivity from performance upgrades add additional value. Policy should acknowledge the health value of superior interior environmental quality (daylighting, air quality) worker productivity and long term building value (future proofing)
    iv. Customer education should include information on local, state and federal financing support for energy efficiency activities.

7. **Public policies and programs should be designed to anticipate the future aggregation of energy retrofit loans into bonds, and to provide the basis for appropriate loan documentation.** Secondary markets, when appropriately controlled for risk, help to maximize financing opportunities and reduce financing costs.

[47] See http://www.greenbuttondata.org/.

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Appendix II: Acknowledgements

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About the Council on Finance, Insurance and Real Estate

CFIRE brings together building industry representatives that play a significant role in how buildings are procured, designed and constructed. Council participants include architects, engineers, contractors and owners; insurance representatives (including professional, property, casualty, environmental and surety); banking representatives (including construction and permanent); investment representatives (including real estate investment trusts, pensions and others); appraisal representatives; and testing and validation representatives. The Council works to promote collaboration and buy-in across these sectors and address the challenges of evaluating risks, benefits, technologies and practices associated with the achievement of cost-effective high-performance buildings. See http://www.nibs.org/?page=cfire for more details.

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The National Institute of Building Sciences (Institute) was authorized by the U.S. Congress in the Housing and Community Development Act of 1974, Public Law 93-383. In establishing the Institute, Congress recognized the need for an organization that could serve as an interface between government and the private sector. The Institute's public interest mission is to serve the nation by supporting advances in building science and technology to improve the built environment.

Through the Institute, Congress established a public/private partnership to enable findings on technical, building-related matters to be used effectively to improve government, commerce and industry.

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