



Research Report

Rocky Mountain Institute RetroFit Depot™

Retrofit Industry Needs Assessment Study
Public White Paper

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Section 1

EXECUTIVE SUMMARY

1.1 Overview

The Retrofit Industry Needs Assessment Study is a part of Rocky Mountain Institute's RetroFit Depot™. Over the next 3-5 years, the RMI RetroFit team will create and execute new approaches to accelerating deep retrofits in commercial buildings. The project aims to retrofit at least 500 buildings within three years and stimulate far greater retrofit activity within the larger retrofit industry. (For more information on RMI's strategic projects and approaches, please visit the website at www.rmi.org/rmi/retrofit.)

As part of this initiative, RMI partnered with Pike Research, a firm specializing in clean technology market intelligence, to conduct original research on the industry via direct contact with stakeholders in the commercial building sector. The purpose of the study was to assess what information key stakeholders in the commercial building sector in the U.S. need in order to pursue deep energy efficiency retrofits.

1.1.1 Retrofit Industry Stakeholders and Motivations Analysis

In the course of its work on energy efficiency retrofits, RMI focuses on three major audience types:

- Building owners/developers—including real estate investment trusts (REITs), government entities, private property owners and facility management groups
- Retrofit service providers—including Energy Service Companies (ESCO), contractors, engineers, and utilities
- Financial institutions—including private investment banks, commercial banks, appraisers, and other lending institutions

The study revealed a number of key differences between retrofit industry stakeholders. On a general level, building owners/developers and financial institutions will play a crucial role in determining the future of deep retrofits and lack informational resources that would help them assess the true value of retrofits and finance projects that go beyond the energy savings typically seen today. In all cases, however, the interviewees noted the importance of tailoring information resources as specifically as possible to the end user, as subtle differences between them can influence the usefulness of those information resources.

1.1.2 Retrofit Industry Barriers

The study investigated a wide variety of barriers that stakeholders in the retrofit process typically face. The study found that the majority of barriers facing both typical and deep retrofits are related to the financing of retrofits and the difficulty of the retrofit process. In particular, two of the main barriers inhibiting the financing of retrofit projects are:

- The lack of data on retrofit performance, in terms of both energy savings and financial payback.
- The current atmosphere of doubt surrounding Property Assessed Clean Energy (PACE) financing programs, which could transform the retrofit industry for private commercial buildings

1.1.3 Retrofit Process

The study also examined the different phases of the typical retrofit to identify those that posed the greatest challenges to stakeholders.

Both the survey and the interviews concluded that project financing remains the most difficult phase in the process for several reasons, including:

- Lack of data to support post-retrofit energy savings
- The low priority of energy issues within the commercial building sector
- The effects of the recession

Beyond project financing, the study revealed that there are challenges in the project initiation/auditing & benchmarking phase as well as the measurement & verification (M&V) phase, such as:

- Technical limitations in the number of qualified auditors
- The perceived high up-front cost of advanced energy modeling techniques
- The cost of undertaking M&V
- The lack of interest in M&V among building owners, ESCOs, and financial institutions.

1.1.4 Key Information Resources on Deep Retrofits

The study revealed a high level of interest in deep retrofits, though few have pursued them due to the range of barriers cited above. Companies and individuals are primarily motivated to pursue deep retrofits by factors such as:

- Reduced energy costs
- Personal interest in environmental issues
- The opportunity to establish oneself or one's company as a leader in the building industry.

The question of what would make the most effective informational resources (i.e., the content that RMI will provide) and informational media (i.e., the vehicle for dissemination of the information) was a central part of the study.

- The respondents to the survey reported that case studies on typical retrofit characteristics, an inventory of common deep retrofit efficiency measures, and improved energy modeling tools could be particularly useful to industry stakeholders.
- The media that the respondents cited as most useful included websites/online media, conferences/seminars, and industry training as the most effective ways for them to access the information.

The study also assessed stakeholders that were not interested in deep retrofits.

- The most common reason for low interest in deep retrofits was the lack of financial resources, followed by limitations in the respondents' job descriptions to take on energy efficiency and the prevalence of split incentive issues in the retrofit process.

However, of the respondents that expressed low interest in deep retrofits, about half suggested that informational resources could increase their level of interest.

Section 2

STUDY STRUCTURE AND METHODOLOGY

2.1 Deep Energy Efficiency Retrofits

Throughout this study, “deep retrofit” is defined as a retrofit that achieves at least 60% operating cost savings with attractive financial returns. A “typical retrofit” is one that achieves 20-25% energy savings, also with attractive financial returns. Examples of measures that enable deep retrofit projects to achieve more aggressive savings include synchronizing efficiency installations with planned equipment and infrastructure upgrades, applying integrated design principles, increasing team collaboration amongst project stakeholders, and using advanced energy modeling and life cycle costing methodologies.

2.2 Study Elements

2.2.1 One-on-One Interviews

RMI conducted interviews with 16 individuals from a variety of backgrounds: four from property developers, six from financial institutions, five from energy service companies, and one from the academic sector. The interviewees ranged in level from project managers to senior vice presidents and owners.

2.2.2 Online Survey

In order to provide breadth to the audience identification study, RMI and Pike Research fielded an online survey. The survey consisted of about 15-18 questions (depending on the individual selections that each respondent made) that identified the respondents’ backgrounds (job title, level, type of company/organization) and assessed their perspectives on deep energy efficiency retrofits and the informational resources that would help the industry achieve them.

RMI partnered with two major real estate trade associations: CoreNet Global, based in Atlanta, Georgia, and the Building Owners and Managers Association (BOMA), based in Washington, DC, to gain access to a large and diverse number of survey respondents.

2.2.3 Market Research

In analyzing the retrofit market in the U.S. for RMI, Pike Research provided market research to ground the analysis of the one-on-one interviews and online industry survey in current market trends and patterns.

Section 3

RETROFIT INDUSTRY STAKEHOLDERS AND MOTIVATIONS ANALYSIS

3.1 Major Stakeholders

The results of the one-on-one interviews and survey suggest that the main challenges in increasing the prevalence of energy efficiency retrofits lie with building owners/developers and financial institutions. The majority of the challenges pertaining to each stakeholder group center on the perceived and actual cost and savings of energy efficient retrofits.

Building owners are averse to risk and do not believe that energy efficiency retrofits add enough value to justify the capital expenditures required. In the same vein, financial institutions lack robust data on the performance of buildings that have undergone energy efficient retrofits. In addition, many financial institutions cite performance failures (such as inaccurate or low quality energy modeling that fails to deliver on modeled savings and a failure to engage engineers early enough in the design stages) as evidence that lending to energy efficiency projects is too risky.

In addition, the study revealed a number of challenges with ESCOs. Several interviewees pointed out the lack of qualified energy auditors as well as limited competence with deep, investment-grade energy audits. Companies that offer investment-grade energy audits are unable to fill vacancies for auditors with the proper skill sets, and training auditors to perform investment-grade level audits is a lengthy and expensive process. On the back end of retrofits, many ESCOs are missing opportunities to maximize energy savings through proper commissioning.

3.2 Public and Private Sector Audiences

The public and private sectors differ significantly in their approach to financing and executing retrofits. The public sector is policy driven, rather than market driven, and accepts longer payback periods than the private sector, which is mostly market driven. While the public sector, including federal, state, and municipal buildings, is responsible for more energy efficient retrofit activity than the private sector and the vast majority of energy efficiency finance has been dedicated to public sector projects, it only represents about 15% of the building stock.

Section 4

RETROFIT INDUSTRY BARRIERS

4.1 Overview

RMI has identified eight major categories of barriers that stand in the way of retrofits:

- Financing: none available, etc.
- Risk/litigation: never done it before; don't want to reduce installed cooling capacity, don't want to force on tenants, etc.
- Business case: no competitive edge for more energy efficient buildings; rapid building turnover; more compelling alternative investments, etc.
- First cost: cost of technologies and of services, etc.
- Split incentives: tenant/landlord; costs of submetering, etc.
- Retrofit process: time-consuming phases; non-standardized analysis/audit procedures; difficulties in engaging all stakeholders, etc.
- Design: few capable engineers; cream-skimming habits; no incentives to maximize savings, etc.
- Awareness and demand: uncertain tenant demand for energy efficiency, etc.

The study provided a current assessment of these barriers as they relate to deep retrofits today and revealed a number of other barriers that may pose challenges to achieving energy savings beyond those typically seen today. Certain barriers, such as the lack of data, the barriers to adopting PACE financing, and the aversion to rigorous audits can be effectively addressed through information resources while others, such as the low priority for energy efficiency and split incentives, may be more difficult.

The one-on-one interviewees referenced these barriers on multiple occasions throughout the interviews. However, the single most commonly cited barrier was the lack of data on retrofit performance, in terms of both energy savings and financial payback.

4.2 Financing

4.2.1 Lack of Data

Financial institutions as well as building owners on the verge of investing in any capital-intensive project reduce the potential risks for investment decisions by using data on similar building projects. Energy performance contracts (EPCs), a financing method for retrofits in which ESCOs provide financing for a retrofit project and repay it through energy savings, have been around for decades in the U.S., and there are many examples of private buildings that have undergone retrofits.

However, data on the demonstrated performance of energy efficiency retrofits is scarce in the building industry. It is difficult to find owners willing to share information related to the capital investment and energy savings from a specific retrofit project, and even harder to find data on maintenance savings or on "intangibles" such as increased rent, decreased vacancy, or higher resale value. As a result, investors and building owners remain averse to capital-intensive energy efficiency projects.

Most energy efficiency projects report energy savings based on energy analyses. The financial world remains unwilling to base lending decisions on a predictive energy savings approach. The major decision makers—building owners and financial institutions—need evidence of demonstrated savings from buildings’ actual utility bills in order to assess energy efficiency measures for future projects with confidence.

For financial institutions, the lack of data prevents them from assessing whether energy efficiency increases the resale value, rents, and operating income of the occupant. Although there have been a number of studies investigating these benefits, the data is neither robust enough nor are the studies rigorous enough to be used in financial modeling and lending decisions. Although many financial institutions have high-level decision makers in a position to change the lending process, their impact is likely to remain limited in the absence of actual data.

Today, lenders are more willing to invest in the building efficiency measures that are considered “low-risk,” which generally translates to high returns and mediocre energy savings. Addressing this lack of data would broaden the range of building efficiency measures that fall within the risk profile that the lending institutions typically adopt. In addition, providing data on higher-risk efficiency measures might convince some building owners with a greater affinity for risk to take on higher levels of risk if the returns on a retrofit are higher as well.

The burden of compiling, analyzing, and developing the data for use in the commercial lending sector may lie at least in part with academic institutions or new/existing industry organizations, as financial institutions alone may not have the resources to develop hard, empirical evidence on their own.

4.2.2 Doubts About the Future of PACE Financing

PACE, or Property Assessed Clean Energy, is a program that creates voluntary tax liens on private property to secure financing for retrofits on existing buildings. The liens are paid off over 5 to 20 years, usually via property tax bills. The effect of the lien on the property owner’s financial statement is to shift operational expense from energy bills to property tax bills. The program is considered a major potential breakthrough in helping private building owners finance energy efficiency improvements.

All of the financial institutions interviewed for this study discussed PACE financing at length given the impact it may have on the commercial retrofit market. Many of them referenced the challenge of pooling together a number of projects in order to obtain financing at low interest rates. One issue is that these pools will need to be well diversified in order to secure favorable financing terms. However, further elaboration of these issues remains on hold while the Federal Housing Finance Agency reevaluates the program.

Despite the broad interest in PACE financing, recent developments have all but halted the further development of the program and place its future in some doubt. The Federal Housing Finance Agency, which regulates Fannie Mae and Freddie Mac, stated that it would not support PACE programs, arguing that they are too risky. The main issue is that PACE financing, which essentially behaves as a loan, is meant to have senior lien status to a mortgage—a measure that does not comply with Freddie Mac regulations.

In the meantime, PACE programs have had varying responses to the statements from the Federal Housing Finance Agency. Many have continued business-as-usual in expectation that the issues surrounding PACE financing will eventually be resolved. Other programs have ceased indefinitely.

The PACE program will likely determine the ease with which financial institutions lend to commercial building projects in the future, and the results of the negotiations in coming months will either dramatically lower the financial barriers associated with efficiency retrofits or perpetuate the barriers the industry already faces.

4.3 Risk/Litigation

The main risks involved with retrofits surround the issue of energy savings and the question of liability when those savings are not fully realized. The study revealed that such risks were primarily related to the lack of data on building performance after a retrofit has been conducted. About 16% of survey respondents who were not interested in deep retrofits cited potential financial and legal risks as a reason, though overall the interviewees discussed barriers other than risk/litigation in greater depth.

One interviewee, an owner/developer, reported that the legal risks associated with retrofits are fairly low. While certain factors such as changing energy prices pose risks to building owners, the retrofit process relies on well-understood mechanical principles and there are few risks in the execution of retrofits. However, other interviewees contradicted this perspective by suggesting that a failure to meet modeled energy efficiency targets remained one of the main risks facing building owners, financial institutions, and ESCOs.

4.4 Split Incentives

The problem of split incentives—in which utility costs are passed through to tenants and owners have little incentive to engage in capital-intensive energy-efficiency projects—is implicit in virtually all discussions of commercial building retrofits in the study.

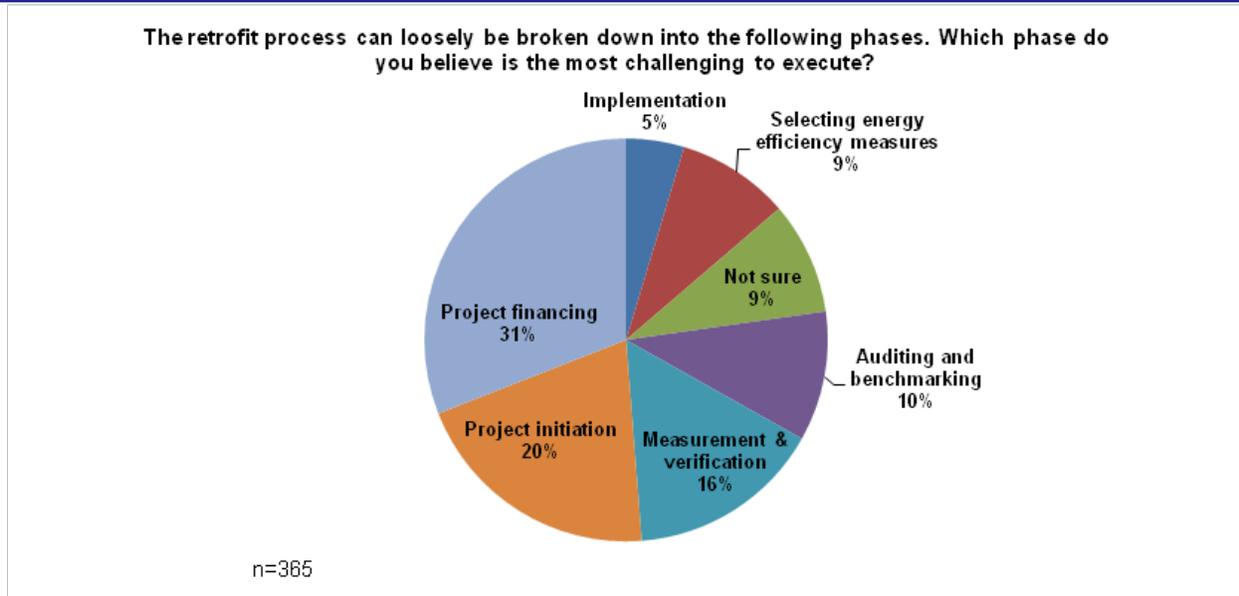
The split incentive issue was raised several times through the study, particularly in the one-on-one interviews. It remains a significant issue, though the interviewees describe it as “obvious,” implying that the issue is widely understood and accepted as a barrier, albeit one that remains difficult to address. Informational resources on green leases (that take energy use into account) targeted at commercial property owners, tenants, and brokers could help mitigate the pervasive problem of split incentives.

However, while the split incentive problem typically describes the owner-tenant split, the study also pointed out an additional split between capital budgets and operational budgets within companies. The parties responsible for capital construction activities are responsible for facility construction but are unwilling to spend money to benefit efficient operations because the operations do not affect them. This problem plagues smaller companies that sometimes lack the sophistication to identify potential benefits of coordinating capital and operational expense management.

4.5 Process

The study revealed several important areas of difficulty that retrofit projects typically face, particularly in the project financing, project initiation, measurement and verification, and auditing and benchmarking phases, as shown in the chart below.

Chart 4.1 Most Challenging Retrofit Phases



Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

Overall, 67% of respondents believe that project financing (31%), project initiation (20%) and measurement and verification (16%) are the three phases that are most challenging to execute.

This corresponds with the one-on-one interviews, as several of the interviewees mentioned these phases on multiple occasions through the interview process. The following sections discuss the findings of the one-on-one interviews on the retrofit process in greater detail.

4.5.1 Project Financing

Project financing remains a major barrier for retrofit projects, particularly in the private sector. Barriers exist on both the owner side as well as the lending side. In addition to the aforementioned issues relating to the lack of data on post-retrofit energy performance and PACE financing, there are other general issues that potential retrofit projects face at the point of procuring financing.

Many commercial building owners still do not consider energy efficiency without external pressure (regulatory, etc.) because they perceive that energy efficiency is too expensive. Although there have been many successful examples of projects involving building owners that have agreed to engage in retrofits with minimal incremental costs, many still do not routinely seek out efficiency for building projects. In addition, the study revealed that energy savings alone are not a motivation for the private sector, and discussions of energy efficiency are best framed in terms of cost savings rather than energy savings for private sector audiences.

The recession has played a role in the recent slowdown of retrofit activity. ESCOs typically obtain third party financing from financial institutions, many of which were impacted negatively by the recession. Thus, ESCOs were particularly exposed to the constrained capital resources available to them over the last few years. Although financial institutions

are becoming more confident in lending to public sector projects according to the study, the commercial sector may be somewhat behind.

On the lending side, there has been some activity in terms of financing options for the commercial sector, though it remains unclear whether any private companies have financed an efficiency project through third-party financing. Although Bank of America and Wells Fargo are beginning to offer “green” loans, interviewees report that companies find it difficult to gain access to capital on favorable terms to them without making a strong case that the risks are sufficiently low.

4.5.2 Project Initiation and Auditing & Benchmarking

As a whole, few building owners are looking at deep retrofits at the outset. In the best-case scenario today, they are usually looking at LEED certification and energy reduction targets in the range of 15-30% below current levels. The study showed that the main areas of difficulty in the project initiation center around the due diligence process of assessing existing buildings for energy efficiency opportunities.

The perceived high cost of investigating the efficiency opportunities available in the building (initial walkthroughs, investment grade audits, project definition, building portfolio analysis) before undertaking a retrofit project may discourage some building owners from realizing the project’s energy performance. Often times, this perception is due to the lack of understanding of the integrative design process and the back-end benefits that emerge from comprehensive analysis up front.

Advanced energy modeling techniques may compromise a large portion of the investigation phase budget for a project. One interviewee cited energy modeling costs as the most difficult step in the process because highly sophisticated retrofits tend to require advanced tools such as building information modeling (BIM) to assess the energy efficiency potential and manage it after the retrofit process is complete. In many cases, the depth of study required to conduct deep retrofits can compound the benefits by revealing previously unseen opportunities to achieve savings.

An additional barrier lies in the building purchasing and sales process. Building developers interested in acquiring properties to retrofit would ideally inspect a building thoroughly before making a purchase. However, many sellers will not allow a prospective buyer to undertake invasive testing before committing to buying the property; without the full due diligence process, however, the buyer is unable to determine the building’s potential post-retrofit value. As a result, sellers face a number of disincentives to allow proper pre-purchase energy auditing to take place. To some extent, recent regulations requiring “mandatory disclosure” in cities such as New York and Seattle are making building energy audits more common and integrating such work into all building sales rather than leaving it as an optional element of the sales process.

Many interviewees agreed that the project initiation phase determines the extent to which whole-building design measures can be implemented. Although many commercial stakeholders may be reluctant to invest so heavily at the opening phases of a project, such investigation can serve as a kind of insurance that the other capital investments a company makes into the building will not fail later on.

4.5.3 Measurement & Verification (M&V)

The role of M&V could play a pivotal role in the retrofit process (and contribute to solutions surrounding “data gathering” barriers), but the stakeholders in many retrofit projects typically have little incentive to undertake this step of the process. An industry-wide enactment of quality M&V would yield the kind of data on post-retrofit performance that would make building owners more likely to undertake efficiency projects and financial institutions more confident in lending to such projects.

The study revealed that many financial institutions would rather place the responsibility of verifying energy savings on the ESCO rather than get involved with an M&V program. Building owners are in a similar position—they believe the benefits of investing in M&V are not enough to justify initiating an M&V program. ESCOs would rather guarantee cost savings without the added cost (and market pressure) of figuring out the extent to which the retrofit met its predicted efficiency targets. A higher standard of adherence to common M&V practices would also help address the lack of trust that exists between many building owners and the ESCO industry.

4.6 Design

4.6.1 “Cream Skimming”

Several interviewees cite “cream-skimming”—or selecting only the measures with the most attractive paybacks and avoiding comprehensive measures that could collectively increase the energy efficiency of a project—as a tendency in commercial building retrofits. Certain types of lighting retrofits, for example, experience short payback periods, and many commercial building owners are reluctant to undertake many more measures beyond lighting. Although bundling low-payback measures with high-payback measures to create an overall cost-effective retrofit has been demonstrated in many cases, several interviewees remarked that the industry as a whole has been selecting only the higher-payback measures in recent years. This issue may be addressed if capital for retrofit projects becomes more easily accessible to private building owners and post-retrofit performance data emerges to provide hard evidence of the energy savings of various efficiency measures,

4.7 Awareness and Demand

4.7.1 Energy Efficiency a Low Priority

Although awareness of energy efficiency has come a long way in the building sector, there are still many challenges that remain. Overall, the ESCOs interviewed for this study have made inroads through relationships with industry associations such as BOMA and the Urban Land Institute, but a significant portion of the industry and an even greater percentage of building owners and managers still do not completely understand or are wary of performance contracting after 30 years of its existence.

Despite a general rise in awareness of sustainability issues in the commercial building sector, several interviewees remarked that energy efficiency in a building’s operations remains low on the list of competing financial priorities. Building engineers are more concerned primarily with near-term issues such as broken elevators and compliance with fire codes than long-term energy management issues they face little pressure to address.

Section 5

DEEP RETROFIT INFORMATIONAL NEEDS

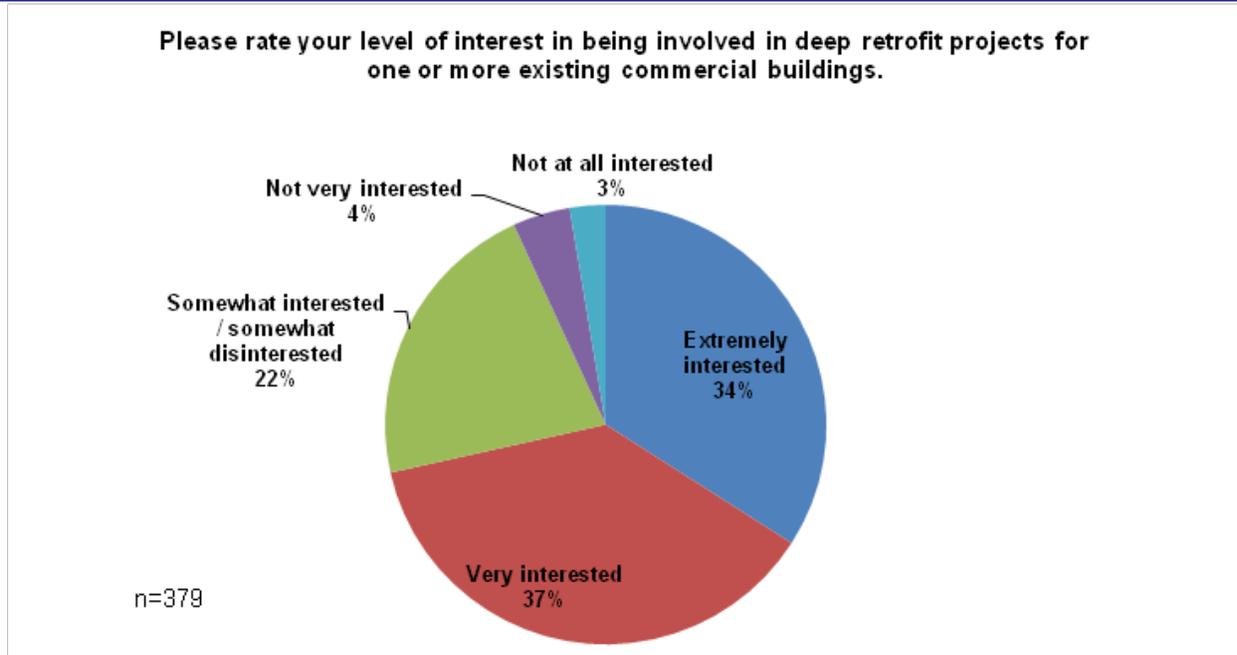
5.1 Deep Energy Efficiency Retrofits

The study revealed that deep energy efficiency retrofits may already be happening in the U.S. building industry, and many of the survey respondents have either completed or are considering a deep retrofit for one or more commercial buildings.

5.1.1 Level of Interest in Deep Energy Efficiency Retrofits

In addition to assessing the overall status of energy efficiency in the U.S. building sector, the study also addressed the interest level and receptiveness of building sector stakeholders in participating in deep energy efficiency retrofits.

Chart 5.1 *Level of Interest in Deep Retrofits*

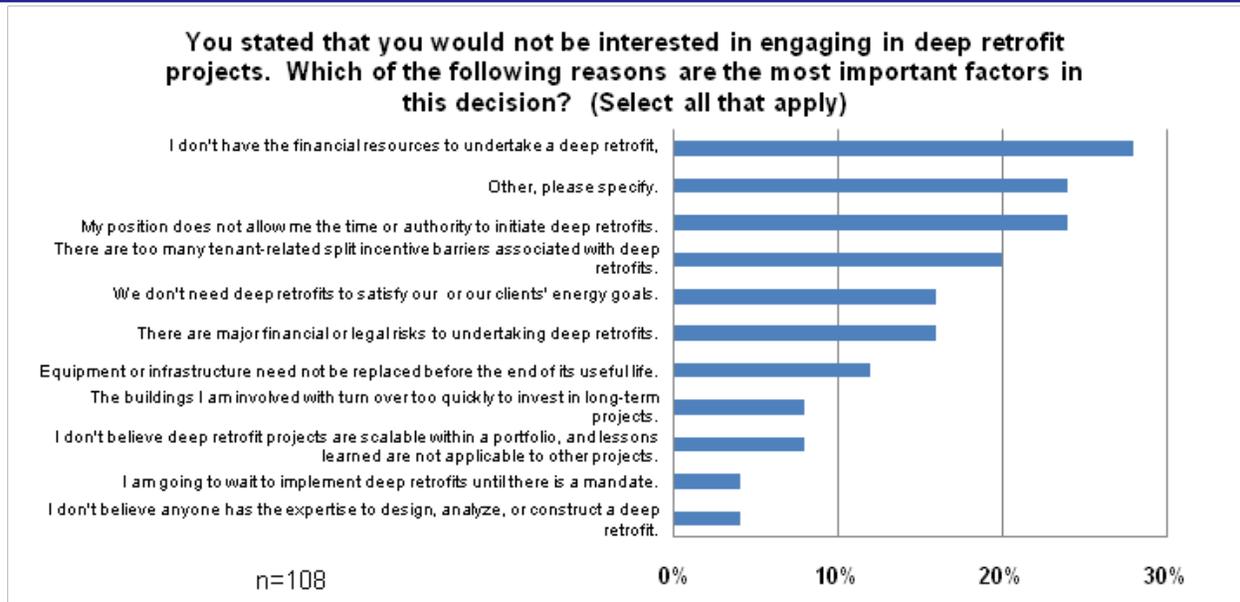


Base: All respondents

(Source: Pike Research)

The majority of survey respondents (71%) indicated a high level of interest in being involved with deep energy efficiency retrofits. Only a fraction (7%) indicated that they were not interested in the concept.

Chart 5.2 **Reasons for Lack of Interest in Deep Retrofits**



Base: Respondents not very interested or not interested in deep retrofits

(Source: Pike Research)

Of those respondents that indicated that they were not interested in deep retrofits, 28% indicated that a lack of financial resources was a major reason. In addition, 24% of the respondents reported that their position leaves them with limited time and/or authority to initiate deep retrofit projects.

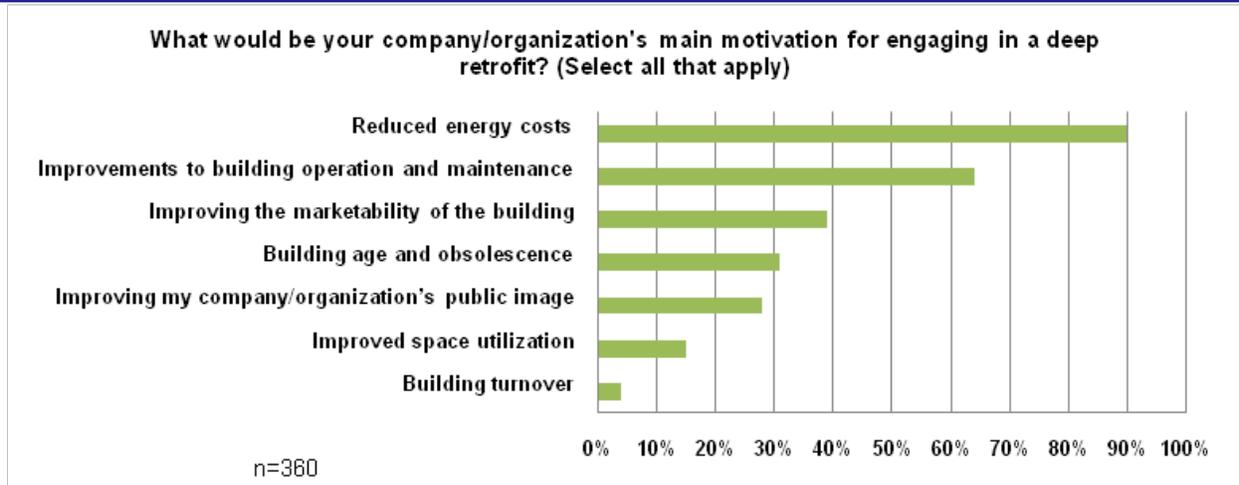
Some of the respondents offered additional reasons for their lack of interest in deep retrofits. Several respondents cited the split incentive issue from a number of perspectives. On one hand, one building owner with a lease structure that passes all expenses on to tenants reported that tenants are unwilling to provide cash for efficiency upgrades. On the other hand, one respondent, a tenant, argued that as a tenant, they have no control over projects and would not be interested in deep retrofits.

In addition, one respondent with a 92 ENERGY STAR score (a high rating on ENERGY STAR's 0-100 scale) argued that their highly efficient building portfolio would be hard to improve upon and doubted that additional efficiency measures would have appealing returns. In a similar vein, another respondent reported that his/her property was only two years old, making a retrofit untimely and unnecessary.

5.1.2 Motivations for Deep Retrofit Activity

The survey revealed several clear factors that would motivate the building industry to engage in deep retrofits. An overwhelming majority of respondents (90%) cited reduced energy costs as their or their company/organization's main motivation for engaging in a deep retrofit. A high number of respondents (64%) also indicated that improvements to building operation and maintenance would also motivate them to engage in deep retrofits.

Chart 5.3 Company/Organization Interest in Energy Efficiency

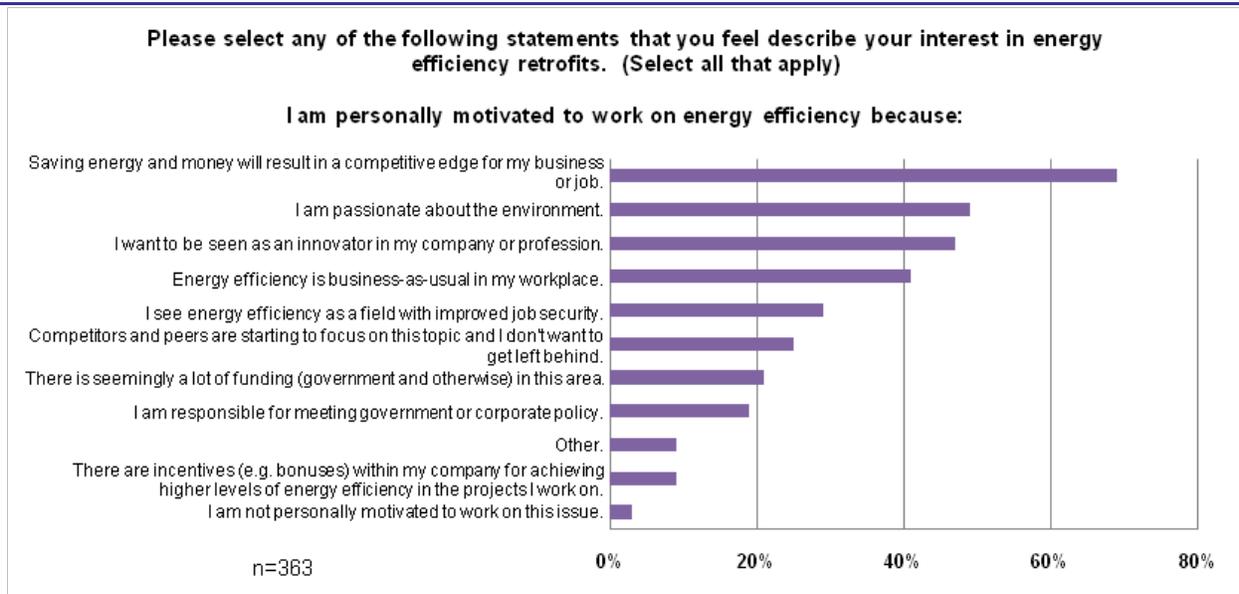


Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

On a personal level, respondents gave a range of reasons why they would be personally motivated to engage in energy efficiency retrofits.

Chart 5.4 Personal Interest in Energy Efficiency



Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

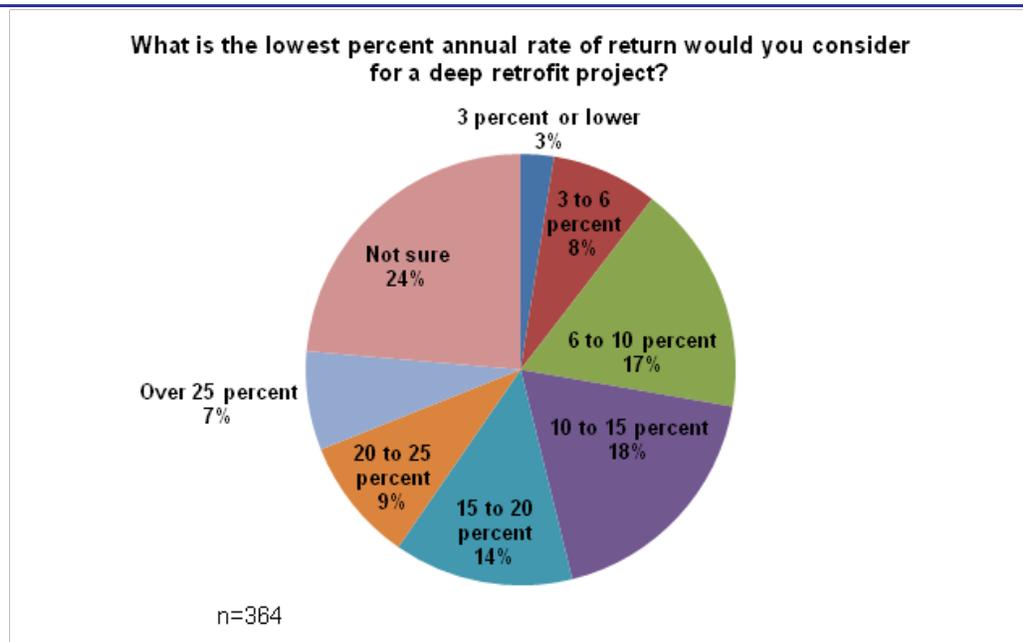
The concept of saving money and creating competitive edge resonated with 69% of respondents to this question. About half of the respondents to this question (49%) indicated a personal interest in environmental protection.

5.2 Rate of Return

The rate of return and payback period is of central importance to assessing the cost-effectiveness of retrofits. Although acceptable rates of return vary somewhat from company to company, the commercial sector typically requires higher rates of return than the public sector. At this point, many building owners would not accept a payback period of more than 2-4 years, according to several interviewees.

The survey revealed a lack of consensus on the lowest acceptable rate of return for a deep retrofit project. The interviews also suggested that rates of return vary from one building owner to another, though governmental building owners are willing to accept much lower rates of return than commercial owners in general.

Chart 5.5 Rates of Return for Deep Retrofit Projects



Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

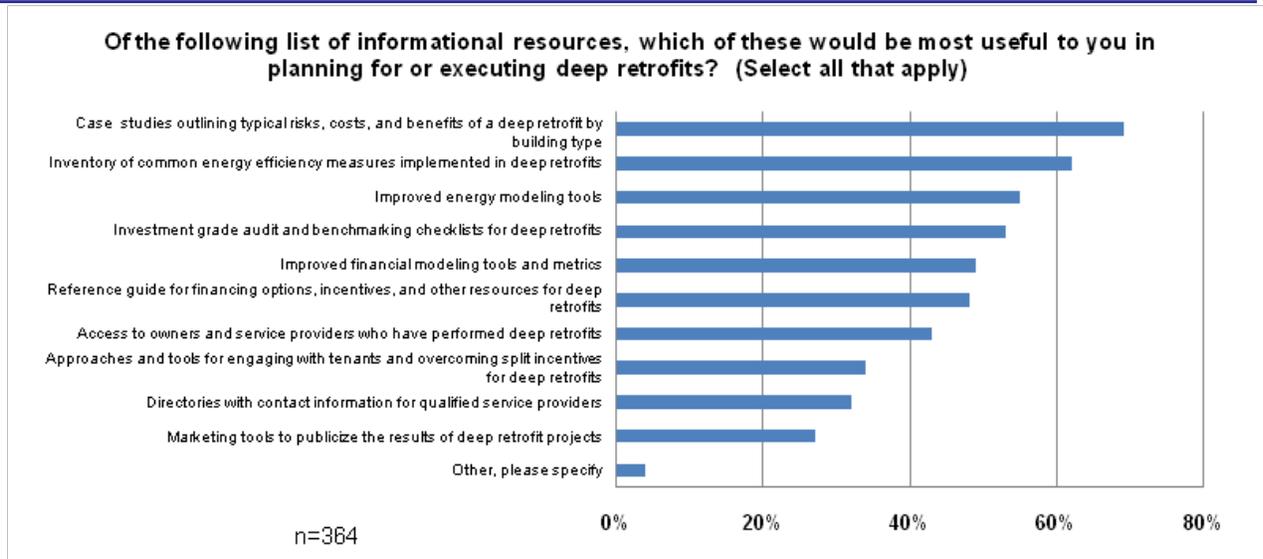
About a quarter of respondents (24%) responded that they were not sure what an acceptable rate of return might be for a deep retrofit project. About half of respondents (49%) indicated that a rate of return of about 6% to 20% would be acceptable, equating to a payback period of about 5 to 16 years. In other words, rate of return criteria for deep retrofits may fall in a similar range to typical retrofits conducted today.

The varying risk profiles of commercial building owners may account in part for the lack of consensus on the lowest acceptable rate of return for buildings. Whereas returns in the public sector tend to be lower given a longer acceptable time horizon for payback, many CFOs on the commercial side require very short payback periods given the quarter-to-quarter financial pressures they face, several interviewees concurred. Still, some commercial building owners may be more willing to take on risk than others if they can achieve higher returns. The public sector as well as commercial owners/developers willing to take on high-risk projects may be the sectors most amenable to deep retrofits.

PACE financing, if implemented on a broad scale, is likely to help commercial building owners accept longer payback terms for deep energy efficiency because the repayment scheme can outlive the ownership term if the owner does not plan on owning the building for more than a few years.

5.3 Informational Resources

Chart 5.6 Most Useful Informational Resources



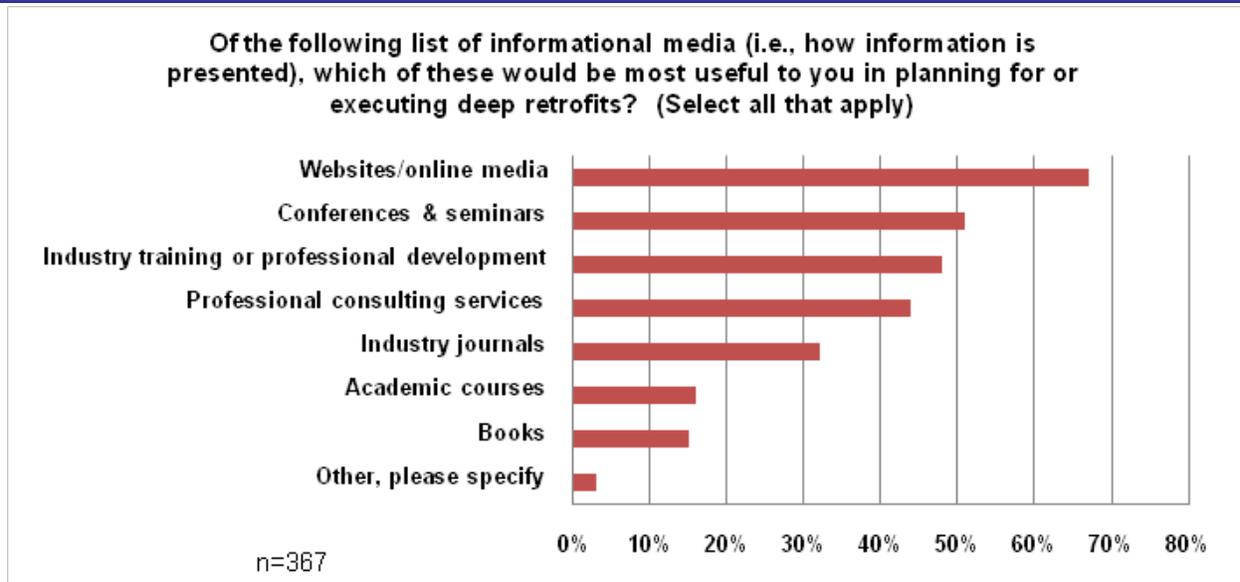
Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

The survey revealed that several different types of informational resources could be useful for planning and executing deep retrofits. Over half of respondents indicated that case studies, an inventory of common energy efficiency measures, improved energy modeling tools, and investment-grade audit and benchmarking checklists would help them implement deep retrofits.

5.4 Informational Media

Chart 5.7 Most Useful Informational Media



Base: Respondents who expressed interest in deep retrofits

(Source: Pike Research)

Respondents to the survey indicated that websites and other online media would serve as a useful way for them to access informational resources relating to deep retrofits. Other media such as conferences and seminars, industry training and professional development, and professional consulting services would also be highly effective media through which to disseminate information about deep retrofits.

Section 6

FINAL CONCLUSIONS

6.1 Conclusions

Today's retrofit industry is on the verge of deep retrofit activity, but numerous barriers still stand in the way. While typical retrofits can achieve up to 20-25% energy savings, the next threshold of energy savings depends on the development of a new body of information that will show that deep energy savings are real, feasible, and cost effective, as well as a supportive policy landscape (including programs such as PACE financing). This body of information will ease building owners' concerns about the perceived risks of undertaking energy efficiency, instill the confidence among financial institutions to lend to deeper retrofits, and open a broader and deeper pool of opportunity for energy service companies.

Although many in the building industry seem to support the idea of energy efficiency in the abstract, those sentiments are not universal, and the perception that the costs of undertaking deep energy efficiency retrofits are prohibitively high is pervasive. Although undertaking proper pre-retrofit evaluations and audits can pay themselves off in enhanced energy savings, many building owners remain averse to investing the capital up-front to discover those opportunities. The effects of the recession, moreover, compound the commercial building industry's reluctance to undertake deep retrofit activities.

Among those who are interested in the concept of deep retrofits, however, the motivations are clear. The opportunity to reduce energy costs is one of the main reasons building industry professionals are interested in deep retrofits. Moreover, many are also motivated by a personal interest in environmental issues as well as the opportunity to use energy efficiency as a means of distinguishing oneself or one's company in a competitive market.

The tools and resources that will move the industry forward include case studies on typical retrofits, inventories of common deep retrofit measures, and improved energy modeling tools. No single solution is likely to solve the problems facing the industry, but, as resources such as these become available, it will become easier for the retrofit industry to realize deeper energy savings. In general, the informational resources highlighted through this study are generally not available to the stakeholders that need them.

Rocky Mountain Institute is planning to integrate the results of this study with its ongoing RetroFit Depot™ to develop some of the key resources needed throughout the retrofit industry. In doing so, it hopes to work through many of the barriers and challenges the industry faces to and to push the U.S. building stock to new levels of energy efficiency.

Section 7

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