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The Future of Financing Advanced Energy Efficient Building Equipment

By Kerry Cebul and Natalie Volpe

Lessors and other institutional investors have been hesitant to enter the commercial building energy efficiency market. What will it take for secondary markets to develop within the efficiency sector? This article looks at both existing and emerging equipment types in this market and emerging financing models.



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When a lender accesses a credit report to evaluate a contract application, it relies on previous information about the applicant's past performance. So does information sharing affect the frequency and severity of delinquencies? This study based on data from PayNet explores the ties between information sharing and payment performance.

When a lender accesses a credit report to evaluate a contract application, it benefits from the fact that other lenders have been willing to share information about the applicant's past contract performance and current indebtedness.

Economic theory and practitioner anecdotes suggest that credit repositories have two important effects on contract originations and delinquencies. First, they help lenders detect bad deals – potential contracts to high risk borrowers with poor track records or excessive leverage – before they are approved. Second, they discipline the borrower's behavior. As soon as a borrower knows that its payment history will be released to other lenders that it may contract with in the future, it strengthens the incentive to make on-time payments.

The results support these hypotheses.

This article uses the introduction of the PayNet repository in the U.S. lending market in 2001 to explore whether and how information sharing impacts the frequency and severity of delinquencies. The “how” relates to the role of firm characteristics, specifically the size and age of the borrower.

Unlike their more established peers, smaller firms do not typically disclose financial statements to the public, attract analyst coverage, or generate substantial media attention. This can make it more difficult for lenders to evaluate the creditworthiness of small firms, which can lead to poor contract decisions or hesitation about working with this group of borrowers to begin with. Additionally, there is less of a stigma associated with missing

payments when they are not revealed in public financial statements or noticed by the financial press.

On the other hand, larger firms tend to have more intensive (in terms of both size and scope) relationships with their lender. They also are more likely to be aware of and respond to the lender's decision to join the repository and make their payment history available to other members. Firm age could also be relevant, given that younger firms are less likely to have an established track record of borrowing.

This study evaluates these predictions by examining how the effects of information sharing depend on the individual and interactive effects of firm size and age.

Borrower information sharing is such a pervasive feature of our

economy that it is easy to take for granted its role in helping lenders screen applicants and allocate capital to firms. While lenders have exchanged information about borrowers for well over a century,¹ there is limited large-sample empirical evidence on the role of information sharing in the U.S. setting. That said, interesting insights have been produced from studies of the introduction of credit registries around the world.

Jappelli and Pagano (2002) analyze the presence of credit bureaus or registries in 39 countries. They find that information sharing is associated with greater lending activity in the economy, and mixed evidence on the change in defaults. Djankov, McLiesh, and Scleifer (2007) use a larger sample of 129 countries to show that the effect of information sharing on lending

activity depends on the legal origin and creditor rights of the

Information sharing obviously plays a role in other lending markets, both in the United States and abroad, including consumer credit and home mortgages, where missed payments are reported to bureaus.

country. Specifically, whereas common law countries tend to support their credit markets through creditor rights, French legal origin nations rely more on state-operated credit bureaus.

Despite this evidence, it remains difficult to discern whether information sharing has a causal effect on delinquencies in the United States for at least three reasons. First, unlike the developing countries that recently introduced credit bureaus or registries for the first time, the United States has sound legal institutions and enforcement mechanisms that help creditors recover proceeds

in the event of default. The role of information sharing for foreign lenders lacking such recourse options is likely to be very different because collateral-based lending is less appealing.

Second, many developing countries implement credit-reporting systems at the same time as regulatory reform and fiscal programs designed to spur lending, investment, and growth. In these cases, how does one separate the effects of information sharing from other concurrent initiatives? Third, and related to this point, the use of economywide measures of defaults and lending do not permit the granular contract-level analysis that is needed to rule out such competing explanations.

The primary hurdle to exploring the role of information sharing in the United States has been a lack of data covering a sizable number of lenders and firms. Even though practically every consumer and firm in the country has a credit report, finding a setting to compare contract-level outcomes before and after information sharing has proven very difficult for researchers. This article fills this gap using

contract data from PayNet's payment information repository.

Multiple aspects of the PayNet database make for an ideal setting to pursue this study. More than 250 lenders have become members at different points of time during the repository's existence. This allows the researcher to control for time-specific influences on contracting before and after information sharing occurs. Furthermore, the repository contains contract and delinquency records for a broad group of firms, permitting the analysis of how the effects of information sharing interact with firm traits.

While this study uses the equipment finance market as a setting, the results provide relevant evidence about information sharing for other developed credit markets. Aside from PayNet, U.S. lenders engage in other forms of information sharing through UCC filings and other reporting systems such as Dun & Bradstreet (D&B). Information sharing obviously plays a role in other lending markets, both in the United States and abroad, including consumer credit and home

mortgages, where missed payments are reported to bureaus.

Related to this point, the U.S. House of Representatives Subcommittee on Financial Institutions recently held a hearing discussing the merits of a proposal requiring utilities and landlords to share positive and negative payment data with credit bureaus (U.S. House, 2013). The purpose of that proposal is twofold: to reduce the number of individuals with thin or empty credit files, and to enable opaque but creditworthy borrowers to get loans.

Looking outside the lending setting, information sharing mechanisms are fundamental features of labor markets (where prospective employers ask past employers for references), insurance markets (where underwriters share claims histories and driving infractions of policyholders), and product and service markets (where platforms such as Angie's List and Yelp influence the decisions of consumers). In these settings, there is a similar lack of evidence on the effect of information exchange.

SETTING AND DATA DESCRIPTION

In 2001, PayNet launched an online credit repository that would allow lenders (including banks, captives, and finance companies) to obtain borrower information via the Internet. The repository operates on the principle of reciprocity: lenders can only participate by agreeing to share all past, present, and future credit files with other members. PayNet employs algorithms and analysts to screen information being contributed to the database for accuracy and completeness, and lenders' identities in the credit files are kept anonymous.

These policies alleviate the natural concerns associated with sharing client information. When discussing Wells Fargo's involvement with PayNet, Senior Vice President and Credit Manager Curt Zoerhof comments "PayNet does make a lot of sense. Our credit department is reluctant to call other lessors for a reference. If you have an anonymous system, that's helpful" (Jackson, 2000).

The PayNet repository offered a more comprehensive and

detailed account of borrower information than competing sources. Unlike the consumer lending market, credit reporting in the commercial market evolved much later, and even in 2000 it was difficult for lenders to know how borrowers had performed on term loan contracts (Murtagh, 2005). Other information sources (e.g., D&B) provided credit files containing utility bill and other smaller short-term payment histories that were consolidated at the borrower level, which offered a noisy signal of creditworthiness for more substantial, long-term lease applications (Jackson, 2001).

More than 250 lenders subsequently decided to become PayNet members, including eight of the 10 largest equipment finance companies. PayNet provided a sample of contracts for this study, permitting the comparison of delinquencies before and after the firm's lender became a member. To preserve the confidentiality of contract parties, the lender and borrower identities were kept anonymous.

The initial sample contains the credit files of 20,000 borrowers, containing over 500,000 contracts with

218 lenders. To ensure a usable sample for the tests, all borrowers have at least one open contract in the two-year period before and after their lender became a member. Table 1 provides summary statistics for the contracts.

The average (median) contract size is \$118,165 (\$26,023); though over 8,000 exceed \$1 million and the largest is over \$1 billion. The mean contract term is 48 months, and the majority require monthly payments. For a typical contract, the average and maximum days past due are 10 and 31 days, respectively, though for firms

with serious payment issues these figures are much higher.

Table 2 shows there is considerable variation in how borrowers perform on contracts.

Forty-three percent of the time, borrowers make every single payment on time. The worst delinquency on the contract is 30 days or less 23% of the time, and 31 to 60 days, 61 to 90 days, and over 90 days 18%, 7%, and 9% of the time, respectively. More than half of sample contracts are true leases, while conditional sales, loans, and lease purchases make up most of the remaining deals. A wide variety of equipment is financed by members, the most common of which is copiers and fax machines, though on a dollar-weighted basis trucks, construction and mining equipment, and computers comprise a larger portion of the sample (not tabulated for brevity).

Tables 3 and 4 describe the lenders and borrowers. The typical lender has relationships with 142 borrowers in the sample via 515 open contracts. These figures obviously understate the true magnitude of lenders' operations given the

More than half of sample contracts are true leases, while conditional sales, loans, and lease purchases make up most of the remaining deals.

sample includes only 20,000 borrowers – a modest slice of the entire market. Lenders vary in the performance of their contract portfolio. The typical lender has 55% of its contracts always paid on time; for lenders at the 25th (75th) percentile the figure is 38% (71%).

When it comes to the frequency of delinquencies over 90 days, the typical lender averages 8%. The average borrower has \$1.4 million of contracts outstanding, has been in business 11 years, and possesses 100 months of borrowing history. Nearly 59% have paid late on an open contract, with 7% experiencing a delinquency over 90 days. For the 60% of firms with non-missing SIC codes, the most common sector is service providers.

Table 1. Sample Contract Characteristics

	Contract size (dollars)	Maturity (months)	Payment frequency (per year)	Average days past due	Maximum days past due
Average	118,165	45.5	11.1	9.9	30.5
Median	26,023	48.0	12.0	1.0	6.0

This table presents descriptive statistics for contracts used in the analyses. Delinquency variables are measured across both open and closed contracts. N=502,972.

Table 2. Worst Delinquencies by Type

	Always paid on time	Late by <=30 days	Late by 31-60 days	Late by 61-90 days	Late by >90 days
% of contracts	42.6%	22.8%	18.3%	7.3%	9.0%

This table categorizes the 502,972 contracts in Table 1 according to the worst delinquency experienced (maximum days past due).

Table 3. Lender Characteristics

	Number of Borrowers	Number of Contracts	% Contracts always paid on time	% Contracts late by > 90 days
Average	142.2	515.4	54.6%	8.2%
Median	20.0	42.6	54.7%	5.1%

This table presents descriptive statistics for the lenders in the analyses. N=218. Figures are measured across the time series of the sample for each lender.

Table 4. Borrower Characteristics

	Total contracts outstanding	Years in business	Have paid late on open contract	Have paid >90 days late on open contract
Average	1,470,905	10.8	58.5%	7.0%
Median	93,508	10.8	65.7%	0.0%

This table presents descriptive statistics for the borrowers in the analyses. N=20,000. Figures are measured across the time series of the sample for each borrower. Total Contracts Outstanding is calculated as the dollar sum of the borrower’s contracts in the PayNet system for a given quarter.

RESEARCH APPROACH

The statistical tests compare various delinquency measures before and after the lender has joined PayNet. The comparison is performed using an ordinary least squares regression, which includes both borrower and lender fixed effects.² Intuitively, this approach measures the change in delinquency for every borrower with its lender individually, and presents an average of this change across all borrowers in the sample.

There are two advantages of this specification. First, by conducting the analysis within borrower, it controls for unobservable firm characteristics or sample composition changes unrelated to information sharing that could bias the results. For example, by becoming a member, a lender learns about and contracts with a pool of borrowers that differs from its prior clientele. In this case, simply comparing delinquencies before and after the lender’s entry to the system is not meaningful because the

sample of firms differs across the periods. The fixed-effects approach avoids this problem by tracking the same firms and lenders over time.

Second, given that lenders join in a staggered (but relatively stable) pattern over more than a decade, the analysis covers a wide variety of economic conditions, reducing the likelihood that the results are biased by the economic conditions present when any individual lender joins (Doblas-Madrid and Minetti, 2013).

RESULTS

Table 5 presents the main results, beginning with an analysis of the average days past due on a contract during its life (if the borrower has more

than one contract, a simple average is used).³ Column 1 (2) shows that in the one (two) year period before the lender’s entry, the average contract goes 6.1 (6.3) days past due. In the one (two) year period after the entry, this declines by a statistically significant and economically meaningful 14.9% (18.3%). Next, columns 3 and 4 explore whether these results hold when using an alternative delinquency measure: the number of days currently delinquent on contracts. This differs from the prior measure in being a more timely measure of contract performance. Whereas the first measure captures the average delinquency status over the life of the contract to date, the latter measure identifies how far behind the firm is on its most recent payment. The results are

similar – over the two (four) year window, days currently delinquent falls by 27.7% (25.9%) of the pre-entry period average.

A natural question is whether the decline is concentrated in a particular category of

A natural question is whether the decline is concentrated in a particular category of delinquencies: Does information sharing reduce the incidence of the most serious types of payment problems, only less serious ones, or both?

Table 5. Change in Delinquencies Around Lenders’ Entry to Repository

	Average days past due (year before to year after entry)	Average days past due (two years before to two years after entry)	Average days currently delinquent (year before to year after entry)	Average days currently delinquent (two years before to two years after entry)
Pre-entry mean (# days)	6.10	6.30	6.48	6.61
Post-PayNet entry	-14.9%	-18.3%	-27.7%	-25.9%
T-statistic	[-7.44]	[-8.81]	[-9.76]	[-10.81]
Post-entry mean (# days)	5.19	5.15	4.69	4.90
R-squared	0.429	0.385	0.325	0.309
# Observations	56,834	66,042	56,834	66,042

Table 6. Change in Delinquencies by Type

	Has been <31 days delinquent (two years before to two years after entry)	Has been 31-60 days delinquent (two years before to two years after entry)	Has been 61-90 days delinquent (two years before to two years after entry)	Has been >90 days delinquent (two years before to two years after entry)
Pre-entry mean	42.0%	14.3%	5.6%	5.2%
Post-PayNet entry	-11.3%	-4.1%	-1.4%	-1.2%
T-statistic	[-9.22]	[-7.76]	[-5.53]	[-5.75]
R-squared	0.265	0.155	0.052	0.074
# Observations	66,042	66,042	66,042	66,042

Table 7. Change in Days Currently Delinquent by Borrower Type

	Average days currently delinquent (two years before to two years after entry)			
	Young, small firms	Old, small firms	Young, big firms	Old, big firms
Pre-entry mean (# days)	5.79	6.51	8.61	7.00
Post-PayNet entry	-27.4%	-16.2%	-37.0%	-32.9%
T-statistic	[-7.28]	[-4.49]	[-11.02]	[-10.04]
Post-entry mean (# days)	4.20	5.46	5.42	4.70
R-squared	0.352	0.364	0.368	0.309
# Observations	18,486	19,955	6,004	21,597

delinquencies: Does information sharing reduce the incidence of the most serious types of payment problems, only less serious ones, or both?

Table 6 examines this question. In columns 1 through 4, the dependent variable is whether (1 = yes, 0 = no) the borrower has experienced a delinquency

of 30 days or less, 31 to 60 days, 61 to 90 days, or more than 90 days during the four-year window. The results show reductions across all categories of delinquency around the lender's entry to the system, though the strongest effect appears in reducing the least severe types of payment problems. Borrowers are 11.3%

less likely to be delinquent by 30 days or less in the two-year period after the their lender joins, though as a percentage of the pre-period mean, the reduction is similar to what happens in other delinquency categories.

The final set of tests examines how payment behavior

changes by firm type. Table 7 separates borrowers into groups according to their size (small if under \$250,000 of ongoing contracts; large otherwise) and age (young if under 8 years; old otherwise).⁴ For brevity, results focus on the change in days currently delinquent over a four-year window, but inferences are similar using other delinquency measures and time periods. Columns 1 and 2 present the change in days currently delinquent in small firms according to their age. Young, small firms see a statistically significant reduction in days delinquent, whereas older small firms see a smaller and statistically insignificant decline.

Columns 3 and 4 proceed to analyze larger firms and show that both old and young firms in this group experience a significant reduction in days delinquent, though the decline is larger for the latter. Together, these findings suggest that information sharing has a more important effect on the payment performance of young firms, controlling for size. Interestingly, controlling for firm age, the results are stronger for larger firms.

One possible explanation for the stronger effect for this is that large firms are more likely to have been aware that their lender joined PayNet, possibly owing to a more intensive relationship with their lender spanning multiple products and involving more frequent interaction. Related, large firms have more to lose in terms of jeopardizing future credit access by missing payments and having it known to a broad pool of lenders.

Young, small firms see a statistically significant reduction in days delinquent, whereas older small firms see a smaller and statistically insignificant decline.

CONCLUSION

This study has examined the change in borrower delinquencies around the period in which lenders entered the PayNet equipment finance repository. Discussions with practitioners and economic research suggest that information

sharing via a credit repository reduces delinquencies by allowing lenders to make more informed origination decisions and strengthening borrowers' incentives to pay on time. The results are consistent with these predictions and show the strongest effect for less serious delinquencies – those involving 30 or fewer days.

The study also indicates that the improvement in on-time payment is driven by large and young firms. These results provide novel evidence about the role of information sharing not only in the U.S. equipment finance sector – an economically large market in itself – but also other credit markets where information sharing is present. More broadly, these findings are relevant to related settings where firms exchange information about the behavior of agents, including insurance and employment markets.

As is generally true of analyses of this type, this study should be interpreted with caution. Some results might be attributed to other changes lenders made to their origination practices at the time they joined PayNet (e.g., hiring more loan officers,

improving their IT infrastructure). Disentangling these effects is difficult without knowing the identities of the lenders in the sample and what conditions were present when they joined.

Additionally, while the PayNet repository resembles other reporting systems in that it compiles both negative (defaults) and positive (successful payments and firm biographical information and operates on the principle of reciprocity, the equipment finance focus is unique relative to the more comprehensive consumer reporting databases in the United States and commercial bureaus around the world. As such, the purpose of this study is to produce descriptive evidence of interesting associations between information sharing and payment performance. These limitations provide opportunities for future research on information sharing.

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Equipment Leasing and Finance Foundation for helpful comments and discussions.

Endnotes

1. Nugent (1939) traces the origins of borrower information sharing in the United States to the 1870s, when immigrants moved from small communities (where personal qualities and wealth were common knowledge) to cities (where one's own neighbors remained "anonymous").
2. To account for correlation between observations in the same period, standard errors are clustered at the quarter-year level. Related, to address concerns about serial correlation overstating the significance of the results, the tests aggregate all contracts at the relationship (borrower-lender) level for each period rather than study each contract separately.
3. The author used the natural logarithm of days-based delinquency measures to avoid problems related to skewness in these variables. Post-entry delinquency figures are presented using the logarithmic approximation to facilitate interpretation.
4. These thresholds were chosen to match common industry definitions of small firms and to ensure a sufficient number of observations in each of the four groups.

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Use of Social Media by Captive Finance Companies

By James M. Johnson, PhD, and Susan Carol

While there are great disparities in social media usage between parent companies and their subsidiaries, research is showing that gap will close in the next few years. Opportunities abound in business development, branding, recruiting, research, news monitoring, product marketing, and customer relations management.

Social media is a term to label the various interactive channels online that enable people to discuss topics of their choice. In many organizations, it is an opportunity for dynamic business-to-business communication if used appropriately and thoughtfully. It also presents the potential for negativity if not managed effectively.

In 2013, this journal published the article “The Evolution of Social Media in Equipment Finance,” by James M. Johnson and Suzanne E. Henry (Winter 2013). Its focus was on utilization of social media by banks and their leasing subsidiaries. A major finding was that use of social media is far more prevalent in banks than in their leasing subsidiaries.

This article will extend the 2013 study by addressing the current state of social media usage by captive financing companies and their parent

organizations to determine whether there are similarities or differences between these distinct types of companies. The captive data is based on new research and phone interviews conducted in 2014, as well as the authors’ review of online channels used by the equipment leasing and finance industry. It reflects and compares findings in past research to current findings and then points to potential future plans in social media.

Because the use of social media is still in its early stages, there is reason to want to know if bank leasing companies are typical of financial services subsidiaries or if they are an exception. This study answers that question.

BACKGROUND

The authors and many of our sources for this article expect that in the near future

social media will be taken for granted and used in the same ubiquitous way business executives embrace web browsers for research and email for correspondence. There are many ways to use social media to benefit a number of business areas.

So far, the opportunities—in business development, branding, recruiting, research, news monitoring, product marketing, and customer relations management—are still underutilized in the equipment financing industry. Some equipment leasing and finance companies have restricted their social media activity to marketing communications managers, which can limit employee involvement. Some limit social media contributions to the parent company’s marketing division, which may significantly limit the messaging opportunities.

Most executives are aware there is a social media policy at some level, but it is not of much concern when they are not active personally. Yet they should be exploring more involvement. Companies that indicate they are not involved in social media are missing an important point: that company may be talked about whether it is involved in the conversation or not. It is better to be proactively involved to help shape the desired message.

WHY SOCIAL MEDIA CREATES AN OPPORTUNITY

The CEO, as chief storyteller in an organization that yearns for thought leadership, should be tweeting, blogging, or posting key messages in LinkedIn (or having someone do this for him or her). Why would the leader of a company avoid a channel that reaches millions

of potential new contacts for business interaction? The CEO does not need to be the engagement individual, but should make this a priority of the company to message and help control what is being said about them.

Most users of LinkedIn are well educated and from the ages of 39 to 49, thus in the prime career-rising years, according to BI Intelligence, a research service owned by Business Insider. LinkedIn, of course, is just one social media channel, but it has been a good starting point for the industry. While originally considered a tool for job seekers and recruiters, LinkedIn has evolved into an online networking resource for businesses and professionals in a broader sense.

Is there a value to having employees socially engaged if they are educated and prepared to navigate these channels? This was addressed in a blog published in the *Equipment Finance Advisor* by R.J. Grimshaw, CEO and president of UniFi, which was recently rebranded from bank lessor Ervin Equipment Finance, with a big splash

on Twitter. He has more than 2,000 Twitter followers, albeit some may be fellow hockey fans, as Grimshaw allows his personality to emerge—the best practice in social media. Some mix of personal and business is considered appropriate, but most company social media policies will advise against participating in online discussions that would be viewed as inappropriate socially or professionally if the meeting were offline.

Sales personnel can be cultivating relationships and monitoring the topics their peers and prospects are discussing. What is being said about the salesperson's products or services? What is being said about competitor offerings? Sales personnel are well suited to contribute to the conversations and help shape the dialog.

Human resources executives can identify new talent in the same channel by reviewing profiles and work histories as well as the way a LinkedIn member presents online. Human resources personnel can also cultivate community interests in Facebook, a channel with more women users than men.

Resources must be applied to create a cross-functioning team approach. A social media policy needs to be adopted, widely understood, and embraced at every level – with a comprehensive strategy in place. Training will be necessary to ensure everyone is comfortable, has appropriate settings established, and understands the protocol of the channel and the guidelines of the company. Social media can be viewed as part of the firm's overall marketing program to ensure a consistent message and benefit from the power of others also sharing the message or story.

SOCIAL MEDIA USAGE BY PARENT COMPANIES AND THEIR SUBSIDIARIES

At many captive and bank leasing organizations, social media is relegated to the parent operations, and financing executives are missing opportunities to introduce themselves to new contacts. Moreover, they are leaving the online door open for negative commentary that they will not be able to readily address because they are not present and have

no community of supporters. Most of the captives that the authors analyzed have social media links on their website (those that have one) that are linked to the parent company's social media sites, making the captive even less identifiable.

This dependence on the parent causes captives to miss out on new ways to serve their customers. The captive is a sales tool for the vendor, a fact that has been well understood for years, per the quote below from a 2008 edition of this journal.

True captive leasing began as successful manufacturers came to realize that their own brand name had value that could be extended beyond the physical product itself. ... Some major corporations developed their own finance organizations. These established brand name organizations with loan financing and leasing plans had a built-in perception of credibility and trustworthy practices. (Allan Essinfeld, "A Perspective on Captive Leasing: Where It Has Been, Where It Could Go," *Journal of Equipment Lease Financing*, Winter 2008)

This extended role as a brand builder should also be developed in new communications channels that reach a desired target audience. Social media channels have a growing audience to justify consideration. As of the end of 2013, there were more than 500 million people on Twitter, more than 150 million on LinkedIn, and some 1 billion on Google+, Facebook, and YouTube. Access to these channels is built into many of the smart mobile devices being purchased, such that mobility is also contributing to ongoing growth.

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COMPARING SOCIAL MEDIA STUDIES

Four years ago when the *Equipment Leasing & Finance*

Other sources—senior communications and marketing executives of captives or banks — find social media efforts challenged by parent constraints, such as limited resources, risks of criticism and the unknown benefits of putting energy in this direction.

Foundation commissioned a study on social media, it was reported that there was much reluctance to become involved in using social media because the executives contacted did not see a potential benefit or know how a return on this investment would be measured, and there was fear of stimulating negativity or not having enough resources to make a full commitment. (The 2010 study, by Four Leaf PR, is titled *Social Networking for the Equipment Finance Industry*.)

In 2013, additional study of social media usage by independents, banks, and bank leasing subsidiaries revealed

that only 15% to 30% of bank subsidiaries used any of the most common social media—YouTube, LinkedIn, Twitter and Facebook. Yet, 60% to 100% utilization rates were recorded by their parent banks.

In 2014, research was expanded to include not only banks and their subsidiaries but also manufacturers and their captives. The research was organized so that it could be compared in part to the 2013 study on banks and their leasing subsidiaries. It was also augmented with reviews of various companies' social media sites and phone interviews with executives responsible for social media strategy or content for these channels. (See Summary of Research Findings below.)

There was also a closer examination of two of the top originators of leasing volume (according to the Monitor 100):

- GE Capital and Caterpillar Financial (Cat Financial) are both demonstrating how captives and industrial financing companies can stimulate engagement online and integrate new social

media with traditional media channels.

- GE Capital's business is based on relationships, and digital and social media offer new ways to connect with their customers, according to Lauren Belt, who heads digital communications for the equipment finance business at GE Capital. One key component of the social strategy is to utilize LinkedIn to connect with business contacts and demonstrate how the right financing can help businesses grow.

Belt said, "We work hard to ensure we have one clear company page, and provide our commercial team members premium access to LinkedIn along with other utilities to help them optimize their profiles, connect with contacts and get the most out of the tool."

Social media offers unparalleled ways of building relationships around a topic or interest area— and that is where GE Capital's commercial lending and leasing business platforms step in. Its 10-plus individual businesses seek out ways to engage with contacts at more

granular levels regarding specific industry topics or interest areas, such as the leasing of construction equipment or healthcare equipment.

Several of GE Capital's commercial lending and leasing businesses have launched Twitter handles, such as @GELendLease, @GEFleetSvc, and @GETruckFinance, along with other social media accounts to connect with interested parties and share more focused content that differs from traditional marketing tactics. "This is usually about our customer's growth and their success, not about leasing per se," Belt added.

The goal on social media is to connect and engage. Belt said, "We track our activities by account and measure the extent to which we are generating interest, prompting conversation and generating follow-up calls and meetings." A number of tools available today automate some of the work of posting and monitoring social media marketing. Large enterprises are investing in robust systems that also integrate with customer relationship management systems.

Kim Neible, vice president of Caterpillar Financial, who has responsibility for e-business, said the intent is to be personally and socially engaged with customers and employees. The company does not view social media just as a sales tool but rather as a means for developing relationships, including for recruitment. "We are coaching employees to use LinkedIn and we are making sure every individual profile is up to date," she added. Today Cat Financial is active on Facebook, LinkedIn, YouTube, and Twitter.

Other sources—senior communications and marketing executives of captives or banks — find social media efforts challenged by parent constraints, such as limited resources, risks of criticism and the unknown benefits of putting energy in this direction. The strongest interest is in LinkedIn—widely considered to be more oriented toward professionals than other social channels.

In 2010, when the Foundation conducted the abovementioned study of social media usage in the industry, Caterpillar was in the forefront of social media engagement. Marcia Colburn,

marketing communications manager for Cat Financial, said the company realized that it needed to go where its customers are and that its contacts are not always the same as the parent's contacts. She also noted that education was needed internally to better understand the social media landscape. Cat Financial started by seeking relevant content that was appropriate for the various channels. "We're conscientious about the type and frequency of comments we post and we monitor for posts we need to respond to," she said.

Looking to the future, she said Cat Financial plans to more closely integrate its social media connections with Salesforce.com to track leads to sales. "It can be hard to determine how all of the social interactions lead to sales," she said. Social media strategies, however, focus on lead nurturing, which supports sales and moves companies higher in search engines.

LEASING INDUSTRY CHANNELS USED

The leasing industry as a whole has become more active in social media. The Equipment

Leasing and Finance Association has more than 10,000 followers in its LinkedIn group, up 30% from last year, and more than 1,000 in Twitter. In addition, ELFA had 428 Facebook "likes," up 25% from last year. Various member companies submit video customer stories for one of the association's websites, and these are frequently channeled through YouTube. The ELFA's YouTube views are up to 11,391, a 32% increase from 2013.

While Facebook is considered to be more a consumer oriented channel, GE Capital's Commercial Distribution Finance business uses it because it finances dealers that sell directly to consumers. It also uses Facebook for posting stories about its community involvement, such as citizenship initiatives and employee volunteer activities at a food bank in one location. Belt says it is also a good recruiting tool. The business finds that prospective employees like to join companies that they see are giving back to their communities.

Banks also continue to lean on parents for social media

guidance. For example, reliance on the parent is the case at Fifth Third Equipment Finance, according to president David Merrill. He realizes there is value in social media but uses it selectively: only where he sees benefits. He explained that marketing and IT resources are shared with the parent for the purpose of standardization. Lastly, he noted as others did that LinkedIn has been helpful in recruiting.

Financing companies that may have a White Clarke Group solution will see that this technology provider has created a pathway for clients to open a business case and manage a resolution of a complaint that starts with a social media comment in White Clarke's CALMS2 platform, which some equipment leasing and finance companies use for efficient business processing. The platform helps manage potentially damaging publicity and allows the finance company to build a process to manage interactions that may no longer start with a letter to the CEO.

Sources for this article predicted that in a year social media will be a greater part of

their interaction with others. However, more use of social media will come sooner for ADP Dealer Services' new spinoff company, CDK Global, and its financing unit, CDK Financial Solutions. Gordon D. Scott, vice president of credit, said that his CDK Financial Solutions unit will be supporting some 400-plus CDK sales representatives and the company is looking to a social media strategy as a way of enriching and expanding the relationships with this internal sales force and the CDK retailer it serves. He views social media as a critical way to strengthen both internal and external customer communications.

Hitachi Capital America Corp. said its acquired company Hennessey Capital (now referred to as Hitachi Business Finance) has a social media strategy that may become the model for the whole company. William H. Besgen, the president, COO, and director, said that while he personally is a "private" person, he is open to new ideas for strategic communications.

The president and COO of that business finance unit, Michael A. Semanco, said he

finds it rewarding to integrate traditional marketing and social media with the focus on building online connections that can develop into offline relationships and be a resource to clients. The unit's primary channels are LinkedIn and a blog. Previously, he said, it also used Twitter but struggled to keep it current, although Hitachi Business Finance may return to it at some future point. For guidelines and brand consistency, Semanco noted the company follows its parent's media policy.

SUMMARY OF RESEARCH FINDINGS

To facilitate comparison of captives with bank finance subsidiaries, the authors

The leasing industry as a whole has become more active in social media. The Equipment Leasing and Finance Association has more than 10,000 followers in its LinkedIn group, up 30% from last year, and more than 1,000 in Twitter.

Table 1. Use of Social Media by Captives and Their Parent Manufacturers—Percentage Using Each Channel

	YouTube	Twitter	LinkedIn	Facebook
Captive	36	21	43	21
Parent	93	100	93	93

Table 2. Usage Statistics for Each Channel by Captives and Their Parent Manufacturers

	YouTube average views	Twitter average followers	LinkedIn average followers	Facebook average likes
Captive	3,989	874	7,585	2,697
Parent	12,880,067	112,102	412,314	1,014,245

followed the same methodology as closely as possible. From the 2014 Monitor 100 special issue (vol. 41, no. 4), we identified all 14 captives on

the 100 list. For each captive and its parent company, we tabulated the percentage using the four social media channels utilized in the 2013 bank and bank subsidiary study—YouTube, Twitter, LinkedIn, and Facebook. The result of that compilation is shown in Table 1. It is readily apparent that the use of social media channels is far more pervasive by manufacturers than their captives. Parent companies range from 93% to 100% usage of each channel. However, between 21% and 43% of the captives have a channel presence—a very large disparity.

Again, to be consistent with the 2013 bank study, we compiled YouTube average views, Twitter and LinkedIn average followers, and Facebook likes for the captives and their parent companies. These results are shown in Table 2.

The data summarized in Table 2 clearly show the large difference in usage statistics between manufacturers and their captives. Having a presence on a channel and activity levels are highly disproportionate. For example, there are 2.6 times more parent companies using YouTube as their captives (93 divided by 36 in Table 1). However, the number of viewings by parent companies is 3,229 times the level of viewings for their captives (12,880,067 divided by 3,989 in Table 2).

How do captives compare to bank leasing subsidiaries? Table 3 permits a comparison of channel presence between captives and bank leasing subsidiaries. The captive statistics are taken from the current study, and bank subsidiary data is taken from the 2013 *Journal of Equipment Lease Financing* article described above.

The percentage using each channel is higher in all cases for captives, but not dramatically so. Neither captives nor bank subsidiaries approach a 50% presence in any of the four channels studied. Thus, utilization of social media channels is dramatically lower for captives and bank subsidiaries than for their parent companies.

The authors decided to compile some newer metrics for the captives and their parent companies, which were not captured in the 2013 bank study. For YouTube, we compiled the average number of subscribers. The average is 97 for captives and 34,594

for their parent companies. We then determined the average number of tweets on the Twitter social channel. The result is 1,113 tweets by captives and 6,285 by parent companies. In both cases, and consistent with our other findings, parent companies make considerably greater use of these social channels than their captives.

Finally, the authors looked at the websites of the captives for social media links. We clicked on each link to see what it linked to. These results are shown in Table 4.

The social media links found on the captive website homepage

Table 3. Comparison of Captive and Bank Leasing Subsidiaries—Percentage Using Each Channel

	YouTube	Twitter	LinkedIn	Facebook
Captive	36	21	43	21
Bank subsidiary	15	15	30	15

Table 4. Website Links to Social Media Channels—Percentage of Captives

	YouTube	Twitter	LinkedIn	Facebook
Links to social media	14	28	21	28
Link to captive social media	7	14	7	14
Link to parent social media	7	14	14	14

It is readily apparent that the use of social media channels is far more pervasive by manufacturers than their captives. Parent companies range from 93% to 100% usage of each channel.

take the visitor as often to the social media channel of the parent as to the captive's social media channel. For example, 28% of captives have social media links on their website homepage for both Twitter and Facebook. However, when one clicks on those links, half the time the visitor lands at the Twitter or Facebook site of the parent. The other half of the time, the link will take the visitor to the social media site of the captive itself.

Comparing the second line in Table 4 (Links to captive social media) with the first line in Table 1 (percentage of captives using each channel), it is noted that 7% of captives using either Twitter or Facebook do not link to it on their homepage—the interested visitor has to find it on his or her own.

CONCLUSION

A Deloitte study of social media usage by CFOs in North America in 2014 suggested that companies have focused mostly on the risks so far rather

than the opportunities, such as using social media to get customer feedback or foster internal collaboration. They say most of CFO attention has been on establishing policies for employees' use of social media, providing education on related risks, and managing the company's presence in key social media channels, according to Deloitte's second-quarter 2014 CFO Signals survey.

The greatest risk in social media is the risk to reputation. Unlike other forms of communication publicly shared, such as traditional press releases, social media channels have greater reach and immediacy, which can lead to increased damage when a mistake is made.

In the near future, when the benefits and risks are better understood within the equipment leasing and finance industry, there will be more productive engagement that helps to link equipment finance to the rest of the engaged B2B communities. Marcia Colburn of Caterpillar

Finance makes a valid point: compare to similar companies outside of the industry to draw on good examples of social media usage. It is clear that the channels may change, but the method of communication is only going to grow. For those who are there, the rewards seem to outweigh the risks.

While there are great disparities in social media usage between parent and subsidiaries, based on our research today, we expect that gap will close in the next few years if not sooner. Our personal interviews with executives seem to suggest there is interest, and the Equipment Leasing and Finance Association is actively leading the way with its use of new media tactics to include distributing video and infographics through social media channels and establishing Twitter hashtags to encourage conversations around various association events. ELFA also is providing educational sessions on the subject at annual conventions and two years ago formed a communications committee.



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The Future of Financing Advanced Energy Efficient Building Equipment

By Kerry Cebul and Natalie Volpe

Lessors and other institutional investors have been hesitant to enter the commercial building energy efficiency market. What will it take for secondary markets to develop within the efficiency sector? This article looks at both existing and emerging equipment types in this market and emerging financing models.

Editor's note: This article is based on the October 2014 Foundation study by Cleantech Group titled The Future of Financing Advanced Energy Efficient Building Equipment. The study is available at www.leasefoundation.org.

A major financial opportunity exists in deploying capital to improve the energy efficiency of the United States' current building stock. Yet much of this potential remains untapped. While certain segments of the building stock have high rates of penetration of energy efficient technology and services, others including the commercial sector have seen limited scale of implementation of more efficient solutions. Moreover, due to a range of barriers, institutional investors—investment banks, mutual funds, local banks, and national entities—have been hesitant to take part in the commercial building energy efficiency market to date.

To better understand the size and nature of this opportunity, this article, along with its affiliated Equipment Leasing and Financing Foundation report, summarizes the commercial

building energy efficiency market size and breakdown. It briefly reviews prominent existing and emerging types of equipment found in commercial buildings and the emerging financing models that enable lessors and other institutional investors to engage with this developing asset class including energy service agreements and managed energy service agreements, Property Assessed Clean Energy (PACE) programs, and on-bill financing and on-bill repayment.

BUILDING ENERGY EFFICIENCY DEFINED

For the purpose of this article and the associated Foundation study, building energy efficiency solutions are defined as products or services that use less energy to condition and maintain the environment within and around a building. As buildings consist of (1) a shell

and internal structure, (2) a set of equipment inside that uses energy to perform functions like heating and cooling, and (3) occupants, who impact the use of the equipment and maintenance of the building structure, building efficiency measures fall into three categories:

Building envelope upgrades: retrofits to static, non-energy consuming building components such as windows and insulation, which affect energy transfer between the built and external environments.

Equipment upgrades: retrofits to energy consuming components, such as boilers, chillers and lighting, and associated controls to meet building operational needs with lower energy consumption.

Operational efficiency: products and services, such as building analytics, to enable,

tune, maintain, and verify the performance of the building envelope and equipment.

BUILDING ENERGY EFFICIENCY MARKET, SIZE, AND STRUCTURE

Market Size and Opportunity

Although specific numbers vary regarding the scale of energy consumption, all are aligned on the fact that the building sector consumes a tremendous amount of energy. As reported by the U.S. Department of Energy, the entire building sector consumes 49% of all energy used in the United States and about 73% of the United States' electricity.

Between residential and commercial buildings alone, this consumption adds up to an annual spend of more than

\$400 billion and \$285 billion on all energy (including electricity, natural gas, and petroleum) and solely electricity, respectively.¹ Experts assume that in much of the building stock, 30% of this energy consumption and a corresponding portion of spend can be reduced.

While investment in energy efficient U.S. buildings stood at around \$18 billion in 2011, Bloomberg New Energy Finance estimates that this number could

scale to almost \$30 billion by 2020.² Deutsche Bank estimates a total investment opportunity of \$279 billion, with a potential to produce over \$1 trillion in energy savings over the next 10 years.³

Market Structure

Tapping into this opportunity requires both an understanding of the building market and the technologies that it relies on. The building market can be broken down by (1) building sector,

including residential, commercial, institutional, and industrial buildings, or (2) buyer type, which focuses on the nature of the organization (private organization, public organization, intuition, residential, etc.) and impacts buying considerations. Figure 1 shows market size by building sector and corresponding example building use types.

The characterization of the market size for building energy efficiency often focuses on build-

ing type, as shown in Figure 1. Yet buyer types are critical to consider, because buyer considerations are core to the issues of financing drivers, barriers, and overall market traction. Buyer types include the labels MUSH—an acronym standing for municipal, university, schools, and hospitals—which represent the state and local buyers that have similar buying considerations due to tax structures—and federal building owners.

Over the past 30 years, energy service companies, or ESCOs, have provided significant levels of service—including both installation and maintenance of energy efficient equipment—to the MUSH and federal building markets. ESCOs were kick-started by the energy crises of the 1970s, and the success and scale of ESCO services has largely depended on deploying financing structures that remove customers’ up-front cost barriers for equipment and installation services.

A similar opportunity exists to unlock the commercial building sector through financing. This sector is characterized by a discrete and consolidated set of use types (e.g., office, ware-

Over the past 30 years, energy service companies, or ESCOs, have provided significant levels of service—including both installation and maintenance of energy efficient equipment—to the MUSH and federal building markets.

house and storage, and mercantile), which represent over 40% of commercial floor space, and a corresponding, uniform set of technologies. As such, the sector comprises an opportunity to implement relatively uniform retrofits (or updates to equipment and building envelope) at scale.

To give a sense of how energy is consumed in a typical 100,000-square-foot office building, Figure 2 shows estimated energy consumption of an office building, broken down by end uses. These include heating, ventilation, and air conditioning (HVAC); lighting; plug load (e.g., small electronic devices); and other (e.g., conveyors, washers, dryers, cleaning equipment, and escalators).

Figure 1. Energy Consumption by Sector in the United States

	Residential				Commercial								Institutional				Industrial ²		
	Single Family	2-4 Unit Building	5+ Unit Building	Mobile Home	Food Sales	Food Service	Lodging	Mercantile	Office	Public Assembly	Service (other than retail & food)	Warehouse Storage	Other	Education	Healthcare	Public Order & Safety	Worship	Manufacturing	Warehouse/Distribution
Energy Consumption (Quadrillion BTU)	10.6				4.8								1.7				*		
Total Investment Opportunity (\$Bn)	\$182B				\$72B								\$25B				*		

Source: Deutsche Bank Climate Change Advisors and the Rockefeller Foundation. *United States Building Energy Retrofits: Market Sizing and Financing Models*. 2012; DOE’s Building Energy Data Book.

Notes: (1) * Energy consumption is measured by site energy consumption (“delivered energy”); excluding off site consumption. Breaking out energy consumption by the “MUSH” (Municipal, University, Schools and Health) category proved infeasible due to lack of publicly available data; additionally, government owned buildings span across various building segments, including residential, office and public assembly, and so the “MUSH” segment has not been called out explicitly. Sub-segments are not exhaustive, rather illustrative, to demonstrate building types. (2) Energy consumption data across the Industrial building sector has not been included because these building types are characterized by irregular energy usage. Also, existing data sources and studies have not been consistent and comprehensive, and thus estimates would be misleading.

Yet commercial building owners and operators have been reluctant to engage with the traditional financing solutions, including ESCO contracts, due to a range of barriers that will be discussed in further depth.

TECHNOLOGY SEGMENTS AND EMERGING TRENDS

The technologies that can improve commercial buildings' energy efficiency are core to this financing opportunity. These technologies fall into four major categories: lighting, HVAC, building envelope, and building analytics and controls.

Within each of these categories, innovative new technologies are being developed that can, in many cases, dramatically improve the levels of efficiency achieved, and in some cases completely change the approach to building operation. To provide insight into the existing and emerging technologies, each category of technology is profiled below, including a brief review of promising innovative companies and technologies in the space. Throughout, we use levels of venture capital investment as a directional indication, at both the technology segment and individual company levels,

of degree of emerging innovation.

Overall, venture investors have shown a great deal of interest in the potential of the building energy efficiency space over the past five years. As depicted in Figure 3, investment for the past five years totals \$5.3 billion, has grown at an annual rate of 4%, and is routinely in the top five sectors of Cleantech venture capital investment.

Lighting

In the United States alone, reducing lighting energy use by 40% would save \$53 billion

in annual energy costs, and it would reduce energy demand by the equivalent output of 198 midsize power stations.⁴

While lighting applications vary from high-output overhead applications to low ambient task lighting focused on illuminating smaller areas, existing lighting technologies including fluorescent bulbs are beginning to be replaced by a major wave of installations of light-emitting diode (LED) bulbs. (See photo in Fig. 4.) Revenue from LED lamp sales in commercial buildings is forecasted to rise to \$8.7 billion by 2021, growing at a

compound annual growth rate of 23%.⁵

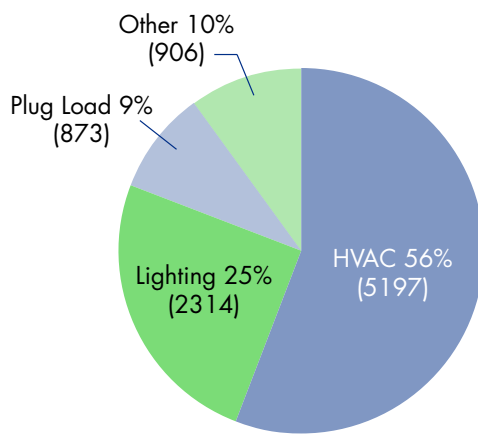
In addition to improvements in underlying technology and efficiency of the bulb itself, lighting control systems have emerged

Figure 4. Cree LED Lightbulb



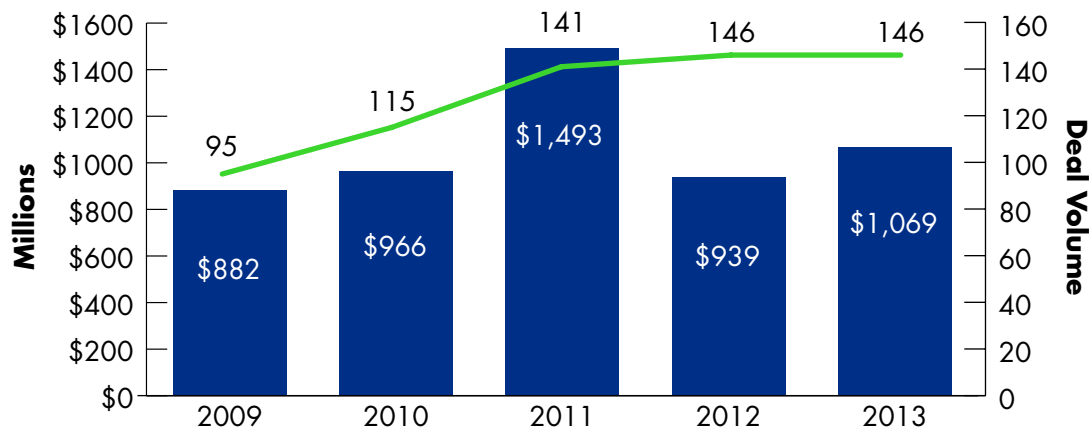
Source: Cree.

Figure 2. Annual Energy Consumption for 100,000 sq. ft. Office (MMBTU)



Note: "Other" category assumed to be critical or otherwise uninterruptible loads.
Source: Cleantech Group analysis; EIA, DOE.

Figure 3. U.S. Venture Investment in Energy Efficiency



Source: Cleantech Group analysis.

as a major area of improved efficiency. Lighting control systems refer to an intelligent, networked system of devices that communicate between various inputs and outputs related to lighting control. These devices may include relays; occupancy sensors; photocells; light control switches or touch-screens; and signals from other building systems, such as security or heating systems.

Adjustment of the system occurs both at device locations and at central computer locations via software programs or other interface devices. Advanced controls and monitoring systems

can allow unoccupied spaces to consume less light and, therefore, less energy.

While venture capital investment in lighting (shown in Fig. 5) peaked in 2011, interest in the sector over a five-year period has steadily continued to grow. It has largely focused on companies developing improved semiconductors for LEDs and systems for intelligent controls.

Heating, Ventilation, and Air Conditioning

Heating, ventilation, and air conditioning (HVAC) systems are one of the largest energy expenditures within a building,

representing nearly 56% of a commercial building's total energy consumption. Efforts to improve the efficiency of heating and cooling technologies have been made over the last several decades through upgrades to thermal distribution systems and advanced component technologies. Air conditioning systems have increased in efficiency nearly 30% to 50% since the 1970s.

Even with this progress, there are still substantial advances in both the design and efficiency of HVAC equipment being made through core technology improvements and informa-

tion technology integration. The expected efficiency gains are correlated with an overall projected annual growth in energy efficient HVAC systems from \$17.2 billion in 2013 to \$33.2 billion in 2020.⁶

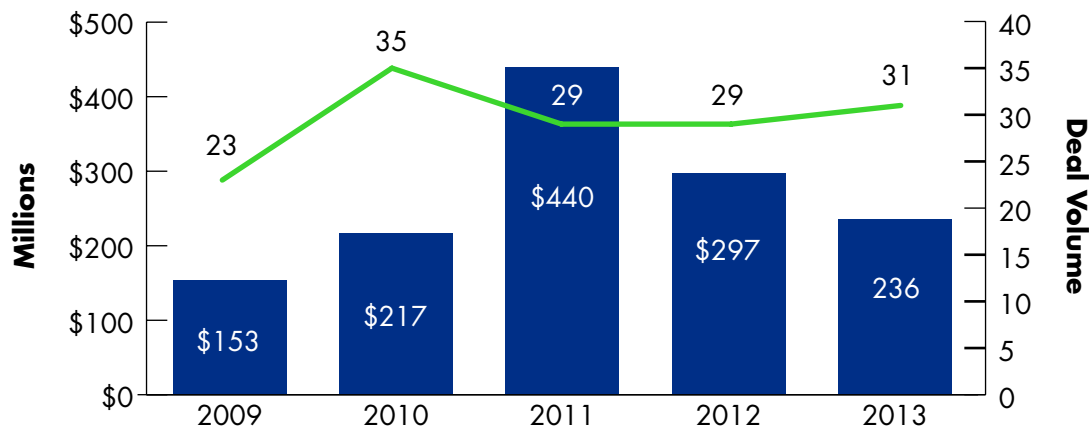
Heating consists of boilers, furnaces, and heat pumps that heat or burn fuel to produce hot air and water that is circulated through ductwork or piping within a building. Cooling applications consist of chillers and air conditioners that distribute cool air or water through pipes, ducts, or condensed coils in a building. Ventilation is the process of replacing or exchanging

air in a controlled temperature to remove contaminants to improve indoor air quality. This process can take place under either forced or mechanical ventilation or natural ventilation using dehumidification or humidification and air cleaning systems. (See photo in Fig. 6.)

Most commercial and public buildings use similar heating and cooling technologies. Many of these technologies remain relatively similar from years past but have been undergoing small efficiency improvements over time.

Innovative new technologies

Figure 5. U.S. Venture Investment in Lighting



Source: Cleantech Group analysis.

Figure 6. Aircuity Sensor Suite Used for Demand Control Ventilation (DCV)



Source: Aircuity.

are emerging throughout these application areas, and, as with lighting, new companies are developing intelligent controls systems to provide detailed insight into and control over the performance of equipment. One particular area of interest is efficient condensing boilers.

Condensing boilers are much smaller, lighter, and able to recover more latent heat than their predecessors. Condensed boilers achieve a thermal efficiency ranging from 84% to 96% and have a three- to six-year payback period.⁷ Many other efficiency upgrades to HVAC units have payback

periods up to 20 years, making condensing boilers a more attractive investment.

Venture capital investment in HVAC (shown in Fig. 7) has grown steadily, peaking at its largest year by both dollars and deals in 2013, with \$161 million and 22 million, respectively.

Building Envelope

The building envelope is the interface between the interior of the building and the outdoor environment. It therefore plays a major role in regulating interior temperatures. Within the overall U.S. building sector, space

heating and cooling account for over one-third of all energy consumed in buildings, rising to as much as 50% in cold climates.⁸ Thus the building envelope's impact on energy consumption is a key part of building efficiency.

There are two dominant perspectives on the relative importance of the building envelope and heating and cooling equipment. The passive design approach supports high levels of energy efficiency in building envelope components, with any remaining need for heating or cooling met by basic, efficient mechanical equipment. The

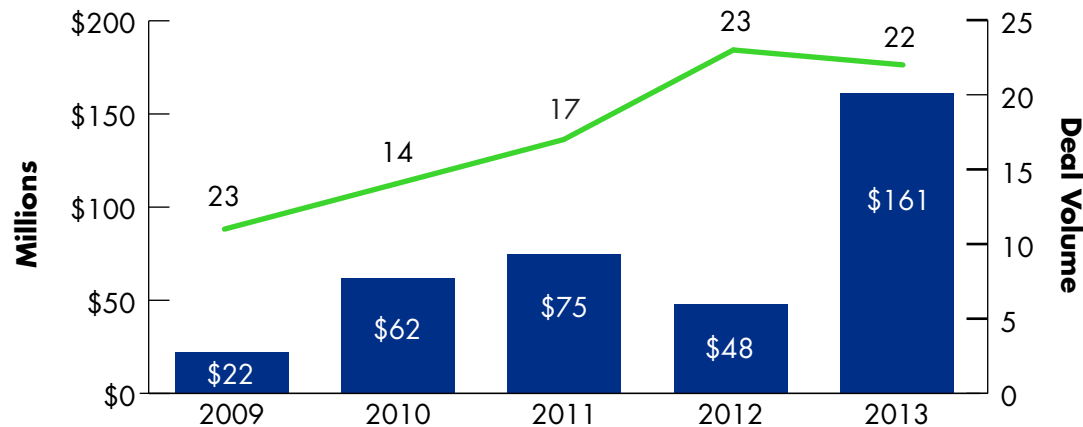
smart technology approach promotes high energy efficiency in mechanical equipment because it is routinely replaced and it is easier to install than retrofitting old, inefficient building envelopes.

From a technology perspective, a range of solutions is applied in the building envelope from improved cool roofs, which reflect sunlight and heat and reduce absorption of thermal energy, to better insulation, windows, and wall materials. One particular area of tremendous innovation and potential for dramatically improved levels of efficiency is smart windows. (See photo in Fig. 8.)

windows. Both dynamically change light transmission, transparency, and solar heat gain coefficients (the metric used to measure solar energy transmittance of a window or glass). Lawrence Berkeley National Laboratory estimates that advanced dynamic window technologies could save as much as 1 quadrillion BTUs of energy each year: more than 1% of the nation's annual energy consumption, or more than \$10 billion in annual energy costs.⁹

Venture capital investment in the building envelope (shown in Fig. 9) has declined slightly, peaking at its largest year by

Figure 7. U.S. Venture Investment in HVAC

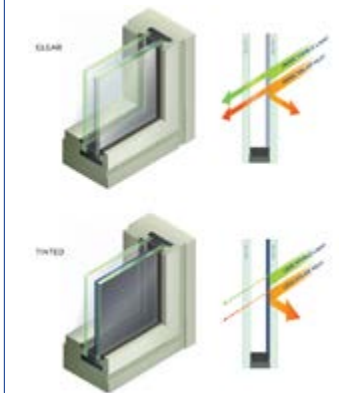


Source: Cleantech Group analysis.

Window elements include framing materials, glazing, coatings, spacers between panes of glass, and low thermal conductivity inert gases to reduce heat transfer within cavities, thermal breaks, and operating hardware. Traditionally, windows have been the weakest energy efficiency link in a building envelope.

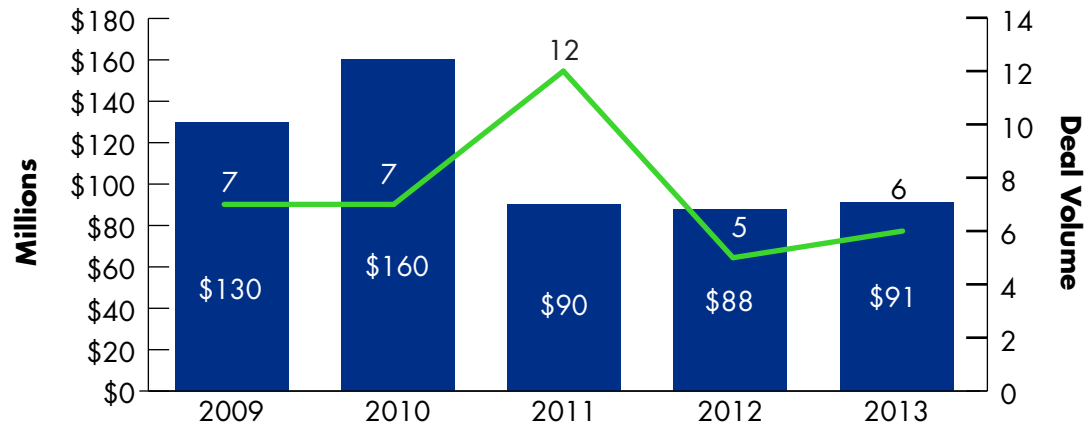
Two types of windows dominate the smart window market: electrochromic windows and thermotropic organic polymer

Figure 8. View Dynamic Glass



Source: View.

Figure 9. U.S. Venture Investment in Building Envelope



Source: Cleantech Group analysis.

both dollars and deals in 2010 with \$160 million across seven deals, respectively.

Building Analytics and Controls

Ten years ago, building efficiency was defined as replacing outdated, low-performing equipment with more efficient and advanced technologies. The same is still true for today’s retrofits, except that levels of equipment efficiency and longevity are able to be dramatically increased by building analytics and controls systems.

Building energy management systems (BEMS) are

software-based systems that monitor a building’s equipment performance, including lighting, energy use, and heating and cooling systems. Cloud-based BEMS technology, enabled by hardware and enhanced with services, is disrupting the traditional efficiency marketplace by providing a low-cost way to drive greater performance of existing building stock.

In the past, traditional monitoring, analysis, and controls required extensive manual oversight from facility managers. However, digital efficiency solutions are altering the energy efficiency value chain and

replacing time-consuming and expensive actions with relatively cheap technological fixes that play an integral piece in energy efficiency upgrades. Understanding the role that information technology is playing in the built environment has become more important than ever.

The overall BEMS market is expected to grow from \$1.8 billion in annual revenue in 2012 to nearly \$5.6 billion in 2020.¹⁰ This fast-growing market segment will alter the delivery of traditional energy efficiency services, with utilities, contractors, and ESCOs forced to comply with ever-changing

products and technologies.

BEMS consist of a method of capturing energy consumption—either directly through sensors as displayed in Figure 10, or from building meters—relaying this information to the cloud, analyzing this information, and either making recommendations for actions or, in a fully automated system, controlling equipment.

Although venture capital investment in HVAC (shown in Fig. 11) peaked in 2011 with \$371 million and 37 deals respectively, the sector has continued to attract both venture activity as well as adoption by major energy service companies, which have partnered with numerous small, venture-backed companies, such as Philips and Daintree Networks, that are working on automation solutions.

EMERGING FINANCING MODELS

Given the size of the potential energy and cost reductions available, stakeholders throughout the building ecosystem have sought to understand the barriers to uncovering the efficiency opportunity. Over the last

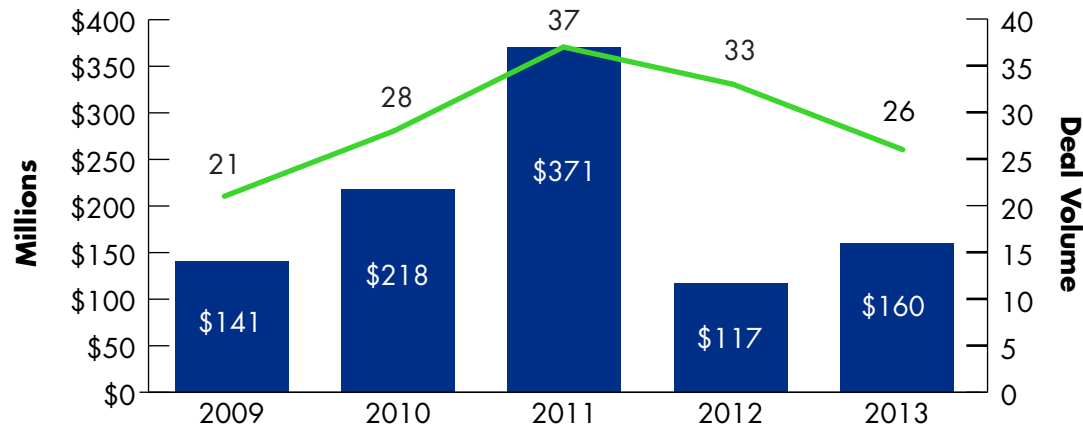
decade, building energy efficiency experts have identified a number of obstacles to implementation of energy efficiency projects ranging from complex payback incentive structures (“split incentives”), unclear business cases supporting efficiency projects, lack of technical expertise, and misaligned internal financial criteria. However, as indicated by 31% of participants in a Johnson Controls survey of building managers, lack of appropriate funding and financing mechanisms was by far the largest obstacle.¹¹

In response to this concern among stakeholders, a number of financing mechanisms emerged to accelerate adoption of efficiency measures. Financing, among other solutions, has been lauded as a major key to

Figure 10. Panoramic Power Wireless Sensor for Building Controls



Source: Panoramic Power.

Figure 11. U.S. Investment in Building Analytics and Controls

Source: Cleantech Group analysis.

accelerating adoption of efficiency measures by addressing the high capital expenditures preventing the market from realizing its full potential. Moreover, as innovative technologies have developed, the potential for efficiency (and the corresponding payback) has only increased. As discussed above, the opportunity is massive, representing a \$279 billion investment opportunity, which would result in over \$1 trillion in energy savings over 10 years.

Commercial Barriers to Efficiency Adoption

While up-front cost is a major barrier to growth, a range of

other barriers has been identified. The following four are commonly cited.

Split Incentives

Common in multitenant or non-owner-occupied commercial building leases, split incentives is a situation in which tenants pay energy costs while improvements to major energy consuming appliances are paid for by building owners. As a result, (1) building owners are unable to directly recoup energy savings and are not incentivized to make efficiency upgrades, and (2) tenants, who usually have short-term leases, are incentivized against upgrades. In the

case of tenants, their cost would be passed on through a rent increase, which, due to a short-term lease length, results in their bearing the cost burden but only a portion of the benefits.

Certainty of Savings

Various parties including building owners and financiers have historically had trouble obtaining a clear and trustworthy picture of their savings as a result of a range of factors. One obstacle is the reality that building owners may not have collected historical data or maintained systems to collect accurate data on energy usage. Another factor, proving that savings

have been achieved due to an efficiency retrofit, is difficult because of varying usage and weather patterns. Poor data collection of ongoing energy efficiency measures results from a number of issues, including the dynamic nature of building use (e.g., shifting occupancy rates or behaviors) and the lack of detailed baselines before implementation of measures.

Technical Expertise

Identifying the necessary upgrades within a building requires deep technical expertise in building systems. Gathering information on building, energy, and financial performance to identify efficiency projects is a challenge due to the complexity of data sets, and is a task typically not aligned with the day-to-day priorities of building owners.

Long Payback and Associated Term Lengths

Energy efficiency upgrades within the commercial sector are characterized by longer payback and term lengths than other investments. While efficiency upgrades provide secure and reliable cost savings (though not always transparent, as explained above), they often

necessitate large up-front capital that requires years to pay back. In turn, this equipment is financed with longer-term lease lengths to make up for the cost of the equipment.

Longer-term leases are less attractive for both companies and investors that require a short return on investment. Equipment upgrades, especially, are larger capital investments that often fall out of scope for building managers with strict ROI requirements.

Emerging Models

To address the financing barrier, three structures have emerged over the last 10 years, including energy service agreements (ESAs), which include managed energy service agreements (MESAs); on-bill financing; and Property Assessed Clean Energy (PACE). (For the purpose of this article, energy service agreements and managed energy service agreements are grouped together because the structure is fundamentally the same, with the exception that under a MESA, the project developer is responsible for utility bill payments on behalf of the building owner.) These structures were predated by energy savings performance contracts (ESPCs), which were developed in the 1970s and

are the major structure used by ESCOs in the MUSH sector today.

The ESCO model provides a comprehensive suite of solutions through large contractors, leverages technical depth of subcontractors, and has had the most success bundling services to provide an end-to-end solution for its customers. Traditional equipment upgrades paid for on the end user's balance sheet or through various leasing and loan structures have been the primary source of financing for efficiency retrofits in the commercial building segment.

Energy Service Agreements and Managed Energy Service Agreements

Energy service agreements address the high initial capital expenditures of an energy efficiency retrofit by delivering energy efficiency as a service with little to no up-front cost to the consumer. In the structure shown in Figure 12, with the ESA model, project developers pay for 100% of the design, engineering, and construction costs, which are repaid by the customer based on realized energy savings, similar to a power purchase agreement for solar installations. The building

owner outsources the energy services and signs a contract assuming responsibility for performance payments back to the project developer based on realized energy savings.

In both an ESA and MESA, the project developer and third-party financier assume financial risk, and the energy contractor (either an ESCO or ESP) is responsible for the performance risk of the project (whether the project delivers the promised savings). The efficiency upgrade is able to remain an off-balance sheet charge with contract terms ranging from five to 20 years, depending on the ESA/MESA

provider and investor preference.

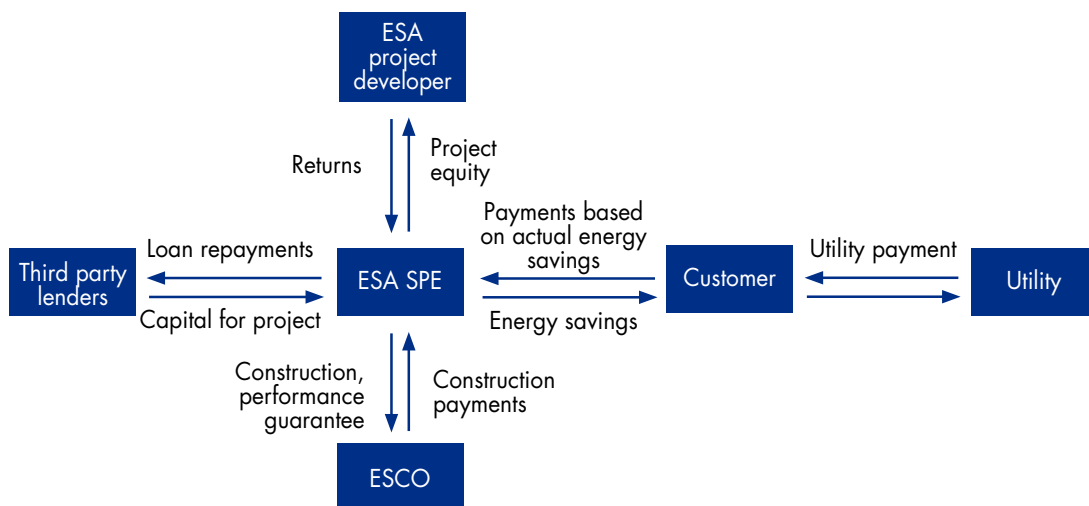
Established in 2007, the Property Assessed Clean Energy (PACE) program enables local governments to finance energy efficiency improvements by issuing bonds from local government municipalities and using third-party entities to service, originate, and administer the upgrade. Projects are implemented through long-term loans that are repaid by an annual property tax assessment of terms up to 20 years secured by a property lien, without any up-front capital from the property owner. (See Fig. 13.)

as of December 2013. Completed projects have ranged in size from \$5,000 to \$7 million. Yet the marketplace is still nascent. Commercial PACE financing is currently implemented in nine states, while 12 new programs and over \$215 million in PACE project applications are under development.¹² Enabling legislation at the state and local government levels to create the operational framework that facilitates PACE financing has been challenging, especially when paired with overcoming resistance from existing real estate stakeholders.

On-bill Financing and On-bill Repayment

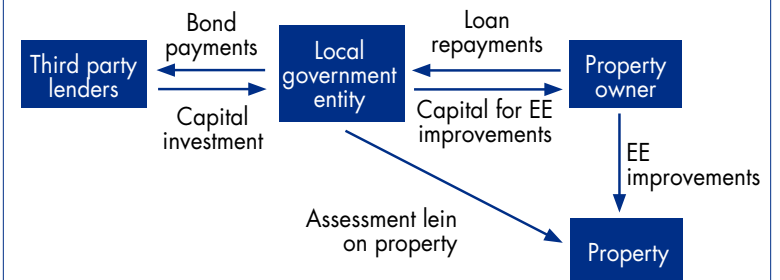
On-bill financing (OBF) and on-bill repayment (OBR) are related structures. They leverage the existing relationship between

Figure 12. Energy Service Agreement Structure



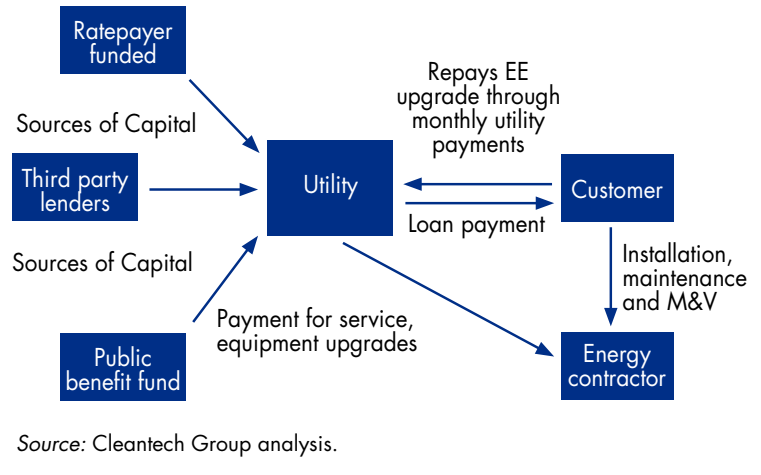
Source: Cleantech Group analysis.

Figure 13. Property Assessed Clean Energy (PACE) Structure



Source: Cleantech Group analysis.

Figure 14. On-bill Finance Structure



utilities and their energy customers to provide easy access to capital for energy efficiency improvements.

Key to the structure (shown in Fig. 14), these loans are then repaid through a customer's monthly energy bill. OBF employs utility capital, either collected from ratepayers or from public benefit funds (funds established by states to support energy efficiency and renewable energy projects), to provide the up-front installation and purchasing fees of efficiency measures.

Alternatively, on-bill repayment enables third-party capital, including banks, lenders, and

alternative energy organizations, to administer loans on the bill. The customer enters into a contract with a bank, and the utility acts as the middleman that distributes funds between the two parties. The new structure attracts more private sector capital by removing the cap on loan amounts and number of loan disbursements per customer. Unlike traditional on-bill financing, however, there is no requirement for bill neutrality.

The benefit to on-bill repayment is an open-sourced financial mechanism in which banks and lenders can shop around for projects with no restrictions on what types of projects to fund. The required legislation and

regulation to establish OBR are currently under development in states including California and Texas.

A comparison of the key components of each structure is shown in Figure 15.

CONCLUSION

In light of the new structures and technologies described above, and as the energy efficiency opportunity begins to become clear, the next question is, What is next? To many, the answer is securitization.

Securitization is the process of combining and repackaging like financial assets and offering

them on a secondary market. This step is critical to attract investors that require greater security and liquidity. In the case of energy efficiency, securitization could be what the market has needed to stimulate demand and attract private capital. However, larger packages of pooled portfolio projects are needed to develop a mature secondary market, and project volume remains low.

The hurdle facing the development of this market is twofold. First, project demand is stagnant due to historical issues like split incentives and high up-front costs, and as a result, the market is currently too small

to efficiently create robust pools of loans. Second, the lack of loan standards and historical energy performance data has prevented institutional investors, including mutual funds, pension funds, and large banks, from participating in the creation of a secondary market for energy efficiency.

For secondary markets to develop within the efficiency sector, greater activity in the market is needed to (1) stimulate large, investment-ready project portfolios and (2) get investors comfortable with project finance loans, which are characterized by lower credit quality and longer term lengths.

Figure 15. Financial Model Comparison Chart

	ESA/MESA	PACE	On-Bill Financing
Target market segment	MUSH, commercial and Industrial	Residential, commercial	Residential, commercial, industrial
Project size	>\$2 million	\$2,000-\$2.5 million	\$5,000-\$350,000
Term length	7-10 years	<20 years	<5 years
Source of capital	Private	Private/public	Private/public
Security/collateral	Equipment	Assessment lien	Equipment, service termination
Risk allocation (financial)	Project developer	Municipalities	Customer
Repayment method	Service charge to project developer	Property tax assessment	Utility bill payments
Market penetration	Low	Medium	Low-medium

Source: Cleantech Group analysis.

Though the market is nascent, recent deals have created a few sizable funds within the efficiency market, indicating that the time for a secondary market may be near. For example, Connecticut's green bank, the Clean Energy and Finance Authority (CEFA), sold off a \$30 million PACE loan portfolio to third-party financier Clean Fund. This deal—one of the first known securitization deals within the commercial energy efficiency market—comes after recent efforts from Hannon Armstrong, Joule Assets, and Deutsche Bank to catalyze the industry through established asset-backed bonds and funds.

With each completed commercial energy efficiency project that is financed, the track record grows, investor confidence builds, and the path toward grasping the \$1 trillion opportunity becomes clearer.

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