Energy Efficiency Finance: A Market Reassessment

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Abstract

Since rebounding from the depths of the Great Recession, the energy efficiency finance market has expanded significantly and is estimated to exceed $100 billion in annual originations within the United States alone. Segments such as green and efficient buildings, hybrid and electric cars, ENERGY STAR®–certified IT equipment, and the energy service company (ESCO) industry are all multibillion-dollar markets. Their scale and success highlight a number of critical elements necessary for the growth and maturity of more nascent areas. Important components include a foundation on an established pathway to the larger capital markets, successful integration of the financing structure into the sales process and value proposition, and a focus on customer needs and satisfaction.

While liquidity has returned to the energy efficiency markets overall, a number of segments remain underserved and credit challenged. These include several persistently difficult areas, such as low- and moderate-income households, multifamily housing, many state and local governments, and the small commercial market. All share many issues due to being highly leveraged and considered higher risk, and due to owners who are often risk averse or unconvinced of the benefits of investing in energy efficiency. Overcoming these real and perceived challenges will require definitive actions and policies.

With the growth and maturation of the energy efficiency finance markets, we also see new opportunities and trends that are likely to remain relevant for some time. Among them are the rise of green bonds and interest from new types of investors, a focus on the customer experience, new methods for evaluating financing programs, and better integration of efficiency into capital planning. All are critical for continuing the momentum seen in the efficiency finance industry and for meeting efficiency and climate goals.

Introduction

Since the publication in 2011 of ACEEE's white paper *Energy Efficiency Finance 101*, much has changed in the energy efficiency finance space (Freehling 2011). The financial markets, then on the verge of collapse, have healed, and capital now flows more freely into a wide array of energy efficiency projects. Property Assessed Clean Energy (PACE) lending, which had come to a near standstill due to the regulatory concerns of the Federal Housing Finance Agency (FHFA), has proliferated to the point that the Home Energy Renovation Opportunity (HERO) program in California has surpassed $1 billion in aggregate lending (A. Matusiak, senior vice president for corporate development and new markets, Renovate America, pers. comm., November 6, 2015). PACE financing exceeds $1 million in daily originations (C. DeVries, chief executive officer, Renew Financial, pers. comm., November 2, 2015). On-bill financing, initially confined to a few small utility programs, has expanded across the country, from Florida to Hawaii. Green banks, largely a concept devoid of capital back in 2011, have become a global force (NRDC 2015).

With all of these changes, new models, opportunities, and needs have emerged for the energy efficiency finance market. Consequently, a reexamination of this industry by ACEEE appears well timed. While the previous paper focused largely on outlining the basics of the marketplace, such as the financial structures, market participants, and underlying motivations of various players, this exploration takes a more expansive view. It examines the lessons learned from areas where efficiency financing is robust, explores the areas where gaps still remain, and highlights several emerging issues that are expected to shape the energy efficiency finance market in the coming years.

The Energy Efficiency Finance Market Today

While the level of total spending on energy efficiency is likely just a best guess, the International Energy Agency (IEA) estimates the market at hundreds of billions of dollars globally (IEA 2014). Irrespective of the exact level of investment or lending to support it, anecdotal evidence (discussed below) suggests that the US energy efficiency finance market represents more than $100 billion in annual investment, with robust access to the global capital markets. Indeed, a number of submarkets are now multibillion-dollar segments themselves with ample liquidity. Among the largest are green and efficient buildings, hybrid and electric cars, ENERGY STAR®–qualified equipment, and the energy service company (ESCO) segment. Each offers important lessons for energy efficiency overall, clues about how best to solve remaining credit challenges, and hints about important issues confronting the field.

GREEN AND ENERGY-EFFICIENT BUILDINGS

Perhaps the largest of the submarkets is financing for the construction and rehabilitation of green commercial buildings. While efficiency may be a small part of the overall construction costs, these improvements are part of projects that routinely run into the hundreds of millions. According to the US Green Building Council (USGBC), nearly one billion square feet of commercial space obtained Leadership in Energy and Environmental Design New Construction (LEED-NC) certification in the United States in 2014 (D. Winters, head of North America, GRESB, pers. comm., December 4, 2015). While the exact cost of the projects is not known, RS Means estimates construction costs at $126–231 per square foot, depending

on the region (Dalvit 2009). Taking the midpoint cost of $175 per square foot suggests investment totaling in excess of $175 billion. Since the USGBC does not keep statistics on the amount financed, we can make assumptions to highlight the relative size. With most commercial properties financing upward of 65% of the construction cost, it is reasonable to assume that loan originations for these buildings exceed $100 billion per year for domestic projects.

The green and efficient buildings segment offers several important lessons for the broader efficiency market. First, the scale and sophistication reflect its foundation on an existing financing platform that has tremendous liquidity and is well integrated into the larger capital markets. Green buildings are simply a variant within the large commercial-property market. Second, robust demand for green buildings, particularly among firms with strong credit ratings, has fueled the segment's expansion. Led by the federal government's requirements for its spaces, Fortune 500 corporations' social responsibility goals, and a belief by employers that younger workers favor green spaces, demand for LEED/ENERGY STAR–qualified buildings has spread rapidly within both the owner-occupied and the multi-tenanted property segments. As demand increased, lenders have followed their clients, a process made easier as the premium on green construction fell to very modest levels. While some lenders may have marketed their appetite for and interest in financing green buildings, the reality is that lending structures and pricing were comparable to those seen in the overall commercial-property market. Little changed from the asset-backed lending carried out before the advent of green buildings. Scale, then, was driven by enhanced demand for these properties, an efficient financing platform, investment-grade credit ratings among the borrowers, and the ability to deliver a better product at a comparable price.

An interesting and prescient aspect of the maturing green-building market is the disconnect between demand for these properties and the modest premiums seen in their valuations and loan pricing. Rather than seeing rising valuations for better buildings, we have seen higher risk premiums assigned to projects that do not achieve these certifications. Lenders now prefer efficient buildings and assign lower valuations to less marketable properties, due to lender concerns about these properties' ability to obtain (strong) tenants if the property needs to be sold following foreclosure. Just as critical, demand for the asset-backed securities containing green and efficient properties may attract more investors, which may expand liquidity and interest in the debentures, but not necessarily lead to better pricing. We see this trend again in emerging markets, such as for green bonds, as described below.

HYBRID AND ELECTRIC CAR MARKET

Another robust area of efficiency financing is the hybrid and electric car market. While considerably smaller than the commercial-property marketplace, its size is still significant. Sales of these vehicles consistently exceed 500,000 units annually and peaked at nearly 550,000 cars in 2013 (DOT 2015). Assuming an average cost of $20,000, the cheapest cost of a hybrid according to Edmunds, total investment is well over $13 billion per year (Edmunds 2015). No good figures exist on the amount financed, but even a conservative assumption of 50% loan to cost puts the expected loan volume above $6 billion per year.

Financing for hybrids, as for the overall automotive market, serves a number of critical functions. Obviously financing allows individuals to repay the initial cost over time rather than in a lump sum, which facilitates a greater volume of sales. This allows individuals with insufficient capital to buy the vehicle, and allows those with ample liquidity to use that capital for other purposes that they may consider more critical or valuable. After all, as good American consumers, we tend to want to have our cake and eat it, too.

But equally importantly, when financing is well integrated into the sales process, customers can be reeled in while at the showroom. As every salesperson knows, once the customer leaves the showroom the likelihood of the sale eventually occurring falls markedly. Thus financing helps close the deal at the time when the customer is most interested and most likely to buy. In many cases it is not just the cost of the financing that is appealing but also the ease of obtaining it. The consumer may very well be able to get comparable or perhaps even more favorable pricing elsewhere, but the extra step of locating that option and securing the capital would greatly reduce the number of cars bought. Many consumers likely would get distracted and simply make do with their existing vehicles.

This lesson is an important one for energy efficiency financing given the growing interest of utility commissions, and in turn of evaluators, in determining the importance of financing for efficiency programs. As will be discussed below, all financing options, even those at comparable costs, are not equal. Ease of the transaction, ability to obtain approval at the time of sale, and terms that fit the transaction or consumer's needs all play a role in a sale moving forward. Measuring the benefit to the customer experience is no easy task, but is likely critical to determining financing's impact on the sales process and determining its effects on customers' decisions to move forward with purchases.

ENERGY STAR-QUALIFIED IT EQUIPMENT

A third large segment is ENERGY STAR–qualified information and telecommunications (IT) equipment. According to the Equipment Leasing & Finance Association, leasing companies have invested close to $1 trillion in equipment finance (ELFA 2015), with approximately $224 billion in new volume in 2014 (J. Zigman, senior vice president, CSI Leasing, pers. comm., September 24, 2015). Per the Association's Survey of Equipment Finance Activity, computers and peripherals account for 20% of all equipment financing, suggesting $44 billion in annual financing activity for computer equipment. While the association does not tally figures on the volume of leasing for ENERGY STAR–qualified computer equipment, that figure is projected to be tens of billions annually. As indicated by the Environmental Protection Agency (EPA), nearly 93% of notebook computers sold meet ENERGY STAR requirements, and as most corporate purchases today are for notebooks rather than desktops, data point to a multibillion-dollar market (ENERGY STAR 2015).

IT equipment financing is interesting because of how it fits within a company's capital allocation process. While most of the borrowers could likely pay cash for computers, financing allows corporations to conserve their capital for other uses considered more critical or for which returns are perceived to be greater. Interestingly the leasing companies provide not only capital but also other critical services, such as recycling of the hardware at the end of the lease—ensuring reuse of the valuable components, safe disposal of the toxic

ones, and deletion of any sensitive information. Thus the process can both allay security concerns and further corporate sustainability goals.

As with hybrid cars, financing is a critical element of the sales process, but it is not the reason for the segment's growth. Other elements, such as the ability to deal with the entire product life cycle from cradle to grave, are equally critical. Additionally, as with green buildings, financing relies simply upon a well-developed financing mechanism, easily scaled to the high level of demand.

Similar to the case of green buildings, demand has largely arisen through self-regulation. While the federal government threatened early on to institute rules, IT manufacturers elected to forestall this regulation by developing voluntary standards. Once these rules were in place, corporations recognized the opportunity to use the newly created ENERGY STAR certification to help them meet sustainability directives. The integration of IT equipment purchasing into companies' sustainability plans is likely part of the reason that more than 90% of notebook computers qualify for the ENERGY STAR designation, while only 34% of desktops do (ENERGY STAR 2015).

Interestingly, the ENERGY STAR designation appears to have little to no impact on IT financing itself. The certification does not appear to raise the residual value or enhance liquidity for the used equipment. Buyers seek out efficiency, but financiers do not even consider it or factor it into the resale market. It has no perceived extra value, despite interest in the designation on the front end.

THE ESCO MARKET

The ESCO market also offers important lessons for energy efficiency. According to the annual survey by Lawrence Berkeley National Laboratory, the ESCO market exceeds $6 billion per year (Carvallo, Larson, and Goldman 2014). Financing for ESCO projects is likewise robust and efficient. One study suggests that roughly 50% of ESCO deals involve external financing (Panev et al. 2014).

This market offers two key lessons. First, financing has greatly accelerated the growth of the market, but the loans are largely identical to other types of financing within the institutional market and generally conform to the underwriting guidelines of the overall marketplace. Second, ESCO finance played only a minor role in stimulating the market. Regulatory changes authorizing the financing among public entities, sales structures instituted by ESCOs, and a better understanding of how efficiency could support customer needs were far more critical than unique financing strategies. Increased demand for ESCO services led the market expansion, and financing merely facilitated the growth rather than instigating it.

CONCLUSIONS

In each case above, financing supported the growth of the segment rather than initiating it. Strong demand for the products is the driving force behind expansion, and the financing structures used typically build upon well-established pathways. Moreover the scale largely reflects the strength of the credits rather than the benefits provided by a more energy-efficient product. Finally, financing is well integrated into the overall sales process and part

of an end-to-end customer solution. Good design, coupled with a strong sales platform and value proposition, has driven the growth seen in these segments.

Where Challenges Remain

Despite the growth and liquidity in the financing market overall and the hundreds of billions of dollars flowing toward energy efficiency, significant gaps remain for some types of credits and certain segments. The most commonly discussed are low-income households, multifamily properties, particularly affordable units, local governments facing credit-rating declines, and small commercial properties. Each presents a particular challenge, but they share a common trait of high leverage, perceived if not real credit concerns, and constrained demand for energy efficiency.

LOW-INCOME HOUSEHOLDS

The difficulties of serving the low-income households segment range from credit concerns among lenders to stimulating consumer interest in energy efficiency given the many concerns facing these individuals. While limited demand is a real issue, the fact remains that even those interested in investing in energy efficiency face hurdles in obtaining credit for the enhancements. In Illinois, for instance, demand is quite robust for home performance measures supported by on-bill financing offered from Ameren. According to the Illinois Department of Commerce and Economic Opportunity, half of the low-income households applying for Ameren's on-bill financing are denied due to credit concerns (M. Lunn, assistant deputy director for energy and recycling, Illinois Department of Commerce and Economic Opportunity, pers. comm., October 23, 2015). While seemingly high, the denial rate in this program is similar to levels reported for other on-bill programs, such as the one offered by the New York State Energy Research and Development Authority (NYSERDA) (Zimring et al. 2011).

One likely explanation for why this market remains underserved is that overcoming credit issues is among the most challenging and intractable problems facing a financing program. In some cases it may not be helpful for the customer to take on additional debt—the amount of leverage is simply already overwhelming. In other cases any access to financing may be better used to solve other critical issues, whether related to transportation needs or the health and safety of the inhabitants. Providing the financing to these individuals may also greatly strain the program design. Programs that target them tend to push cash flow–positive investments, which can be a very high bar to overcome, especially in the residential market.

Given the challenges posed by serving low- and moderate-income households, we suggest cementing stronger connections to lenders that are already assisting these communities. The work done to bring together the energy efficiency industry and mission-driven lenders, such as community development financial institutions (CDFIs), represents a good start. In our previous paper we detail a number of examples, such as the pioneering efforts of the Reinvestment Fund and Craft3 (Freehling 2011).

One emerging trend is to make better use of mechanisms previously developed by the community development industry to increase access to credit for low-income communities. For instance, the Solar and Energy Loan Fund (SELF) in Florida has begun to deploy several

tried-and-true strategies developed over the past 30 years by community development lenders and practitioners. These efforts include connecting lenders and their borrowers to socially responsible individual investors through the Calvert Foundation, using peer-to-peer lending networks such as Kiva, and accessing lower-cost and more-flexible capital from religious institutions (D. Coward, executive director, Solar and Energy Loan Fund, pers. comm., October 29, 2015). Doing so can reduce the cost of capital or lower risks, which helps lower the interest rates ultimately paid by the borrowers.

All of these strategies have historically helped steer billions into low-income communities and could provide significant support to energy efficiency finance going forward. The opportunities for further strengthening these ties appear great and should be expanded, given the important lessons learned by these institutions and the tools they have developed over many years of trial and error.

In addition to accessing these important tools, the energy efficiency industry must tackle several key challenges. One is determining which institutions are best suited to manage the funds provided by governments, utility programs, and foundations that can provide capital for loan loss reserves or buy down interest rates. On one side are existing lenders in the energy efficiency space, who may have little experience serving low-income households. On the other are lenders committed to serving low-income communities, such as CDFIs, which may lack efficiency expertise. Each has important strengths and critical weaknesses. The best option is probably for these groups to work together more formally.

Another challenge is how best to ensure that subsidies reach the intended targets, such as by requiring proof of income among participants. The difficulty is that verifying income levels can put undue burdens on contractors and lead to embarrassment among customers. One way to overcome this issue would be to follow the philosophy of the CDFI Fund, which targets low-income communities rather than low-income households. The logic is that most individuals living in these areas likely meet the requirements or will benefit from the investments. By looking to the census tract, which can be determined without tax documents from the borrower, contractors or program implementers could avoid extra paperwork burden and uncomfortable income questions. Dealing with these concerns is a key part of making the process easier and enhancing the experience for customers and trade allies alike.

MULTIFAMILY HOUSING

Another submarket commonly said to be underserved is affordable multifamily housing. Financing challenges are most severe for these properties at certain times in their capital cycles rather than throughout their existence. During initial construction or when these properties undergo a recapitalization, owners and developers often pursue energy efficiency due to requirements by state sponsors controlling tax credit allocations. Indeed, in many states, developers would be unlikely to secure tax credits without this focus.

The most acute challenges instead arise during the 15 to 18 years between capitalization periods. The issues around efficiency enhancements in these out-years are many. A common issue is the degree of leverage at the property level. The amount of capital used to construct and maintain these properties can easily equal or even exceed their appraised value. The

leverage also puts great stress on the property's debt service coverage since the rent rates are capped by the federal government in exchange for use of the low-income tax credits. So finding lenders willing to provide the new debt, at subordinated or unsecured terms and at affordable rates, is difficult at best.

Another key barrier is the fact that obtaining more debt requires consent of the existing lenders. The primary lenders, already worried about repayment of their debts, will rarely allow new financing since they cannot be certain that the new debt will not undermine payment of their loans. Even if lenders are open to additional financing, it can be time consuming and costly to obtain the agreements. Additionally, in some cases, while the lenders may be open to the projects, small equity holders may not be. Securing agreements from numerous parties drives up the costs of the transactions and often makes the deals unprofitable and unpopular for all involved.

An equally difficult challenge is securing interest of the owners and managers in efficiency investments. Many owners are severely risk averse and not eager to invest in efficiency, even when cash flows may be favorable. In many cases they simply do not believe that the savings will materialize. In other cases the disinterest simply reflects lack of time to focus on this particular facet of their buildings, given their many other challenges. In still other cases this attitude reflects the reality that other needs, such as a new roof, trump the benefits from lower operating costs or fulfilling sustainability goals.

Stakeholders have undertaken several efforts to overcome these many challenges. In some areas, most notably California, affordable-housing supporters see on-bill structures (whether implemented as on-bill financing or as on-bill repayment) as a potential solution to these challenges, since the US Department of Housing and Urban Development and other lenders view these instruments as operating agreements rather than as debt. A less commonly used instrument is debt supported by New Markets Tax Credits, a federal tax credit administered by the CDFI Fund. In Chicago a local community development corporation used the subsidy available through these tax credits to overcome lender concerns about repayment and investor concerns (Greenberger 2014). Perhaps the most successful effort involves Elevate Energy's Community Energy Savers Program, which has touched tens of thousands of units in Chicago and is a model for national efforts (Elevate Energy 2013). However, even with a proven model, the program has had difficulty expanding beyond Chicago. With its primary lending partner, Community Investment Corporation, unwilling to expand to other geographies, Elevate has been forced to find comparable partners in other locales, a daunting task. Thus, while models and successes exist, scaling them has proven difficult.

Even if lending partners or capital could be found, streamlined service to the market is needed. Certainly designs involving one-stop shops, such as Elevate's Community Energy Savers Program, have shown promise in driving efficiency in specific markets, but reaching owners on a national scale remains a challenge. One-stop shops combine lending, program outreach, technical assistance, and contractor selection and oversight into a single program offering.

One possible solution is better integration at the regional and national levels, attempted by associations such as Stewards of Affordable Housing for the Future (SAHF). SAHF's

membership consists of the largest nonprofit owners of affordable housing, which in aggregate manage more than 100,000 units (Braman, Kolberg, and Perlman 2014). SAHF's staff works tirelessly to promote efficiency to its membership. However, even with the support of staff and interested owners, progress can be slow and difficult. One idea is to focus on easily affordable improvements that can be covered by cash reserves. Another is to target a single measure, such as LEDs, and ensure that units across the country are tackled in one targeted effort. In any case stakeholders must ensure maximum efficiency during the more routine capitalization periods, when all parties are aligned around sustainable outcomes.

STATE AND LOCAL GOVERNMENTS

A third credit-challenged group is low-rated state and local governments. States such as Illinois, under pressure due to their debt levels or unfunded pension liabilities, face difficulties obtaining funds at manageable rates for efficiency investments. As with households, solving for credit quality issues is not easy. Certainly creating separate loss reserves and other types of credit enhancements can help, but finding the capital to adequately meet these needs will be a challenge. The area may require federal funds so that the low borrowing costs of the federal government can be passed along to states. Perhaps the federal government could help states create revolving funds, or it could continue efforts to allow existing federal funds, such as for water infrastructure, to be utilized to promote energy efficiency.

Another option would be to consider repurposing American Recovery and Reinvestment Act (ARRA) funds, such as those provided under the Retrofit Ramp-Up program.[1] Under this program, entities received funding to support new lending mechanisms, but with the funds came burdens to ensure that program rules, such as Buy American and prevailing wage ordinances, were followed. At first many recipients assumed that the reporting requirements would end once initial loans were disbursed and not follow the capital into subsequent financing. However the reporting and compliance requirements have continued into perpetuity. Many recipients of these dollars are now concerned about the unending reporting requirements and are considering simply granting the funding to local entities rather than perpetually recycling capital into financing programs. Perhaps these funds could be aggregated into a central fund administered by a national organization and used to support efficiency at the state or local level.

THE SMALL COMMERCIAL MARKET

The small commercial market's challenges also relate to a number of the elements outlined above. These include high levels of debt, repayment concerns among lenders, elevated transaction costs, and risk-averse owners. More recently the problem of obtaining clean titles has surfaced for PACE providers, adding yet one more issue to the mix. As with affordable multifamily housing, securing efficiency at times of capitalization is undoubtedly the best way forward. However, unlike in that segment, there are fewer stakeholders

[1] Retrofit Ramp-Up is a US Department of Energy (DOE) initiative to provide funding to grow innovative energy efficiency ideas and programs.

pushing for greener outcomes at the outset. This is one reason CB&I launched its Energy Advantage Program targeting owner-occupied properties. The goal is to provide a one-stop shop for small-business owners and reduce burdens on owners to identify opportunities, understand financing options, and secure available utility incentives.

Cost of capital is probably less relevant for this market than for other submarkets. Instead, creating positive cash flows is paramount. The need for positive cash flows is yet another reason to build efficiency into capital events, since it is during these major recaps that longer-term financing is most available. Having longer amortization periods will in turn allow for more-comprehensive retrofits and raise the likelihood of cash flow–positive investments.

PACE financing may be a good option for this market, especially for the owner-occupied segment. PACE is a loan product collateralized by real estate tax liens. It has the advantage of offering longer-term financing at more affordable rates than conventional financing, since the loans are backed by a government's ability to assess and recoup property taxes.

One issue is that small-business owners may not be interested in considering energy efficiency when initially purchasing properties. During the purchase process, they focus squarely on securing the property and often feel that adding any more complexity could lead sellers to select another buyer. Admittedly this concern may be fueled by brokers and others who are intent on ensuring a quick process, but the buyers' angst is certainly understandable. Many owners, however, recognize the value of efficiency and are willing to invest in it once they obtain the property. Because PACE financing can be layered in after the sale and transfer of ownership, as another element in the financing stack, PACE could provide the secondary capital needed for these efficiency improvements. PACE is particularly attractive because it can offer longer amortization terms than are typically available for equipment (15 years for PACE versus 7 to 10 for equipment financing). Moreover, since their properties are often very highly leveraged, small-business owners may have little ability to obtain additional conventional debt for efficiency. PACE lenders tend to allow higher degrees of leverage and have lower down-payment requirements than most banks.

A key element needed for PACE to proliferate is an easing of the difficulties in obtaining lender consent, which is a requirement for commercial PACE. One step that could help open the market would be for the Small Business Administration (SBA), likely the largest single lender to the small commercial market, to agree to provide consent for PACE financing when appropriate. If SBA provided specific criteria and a transparent process for giving consent, it could help transform this marketplace.

PACE is also a good example of how scale comes more easily when building upon an established financing conduit to the capital markets. Scale was achievable quickly because PACE builds upon an existing financing structure—public bonds backed by property tax liens. Additionally, PACE demonstrates how important program design is to growth. According to leaders in the PACE market, enhancement of the customer experience, such as through new technology that better manages workflows and more training for contractors, now largely drives market expansion. Financing supports the expansion, but growth is largely a function of a better process.

Emerging Trends

With the overall growth and maturation of the energy efficiency finance field, several issues have emerged that are likely to remain relevant for the field for some time. Among them are the migration of solutions created for the development finance industry into the efficiency finance market, methods for evaluating financing programs, and greater attention to the customer experience.

GREEN BONDS

As discussed above, a growing trend is the use of tools from the development finance industry for energy efficiency and renewable energy purposes. One of the most innovative tools is green bonds, debt instruments whose proceeds are used for environmental purposes. Green bonds are a new variant of development bonds, which were created earlier to help fund large economic development projects such as new roads, waterworks, utility plants, and infrastructure. Common uses of green bond proceeds include energy efficiency, renewable energy, and green infrastructure (Frey et al. 2015). Though the World Bank initially created these bonds to support its work globally, and other development finance institutions such as the European Bank for Reconstruction and Development (EBRD) have largely funded them, issuers have expanded to include other governmental entities and even corporations. The green bond market has expanded quickly since its launch, exceeding $36 billion in 2014, triple the volume of 2013. While growth leveled off in 2015, activity and interest remain prodigious (Olsen-Rong 2015).

As with lending for green buildings, benefits to issuers may not necessarily be seen in better pricing. While better pricing can result, a more common benefit to the issuer is the ability to reach new investors and achieve greater liquidity for the issuance. For instance, the District of Columbia Water and Sewer Authority had subscriptions for more than $1 billion on its $300 million green bond offering, allowing DC Water to increase the bond in size by $50 million. Interestingly the Authority was able to expand the issuance while also decreasing the yield by 15 basis points. Just as beneficial, the Authority was able to extend the maturities to better match the useful life of the investments—in this case, to 100 years (M. Kim, chief financial officer, DC Water, pers. comm., November 13, 2015). Many believe that as investors' appetite for green bonds grows, bonds that lack an environmental purpose, or ones that in fact harm the environment, could face limited demand, which ultimately could impact their pricing. Thus green bonds may not be sold at a premium, but "brown" bonds could face worsening prices.

While multilateral development institutions, governments, and universities were the pioneers of the green bond market, corporations have now entered the market. The first corporation to do so was Toyota, which issued the debt to fund the construction of a new Prius plant. On the demand side for these bonds, the entities purchasing the bonds have expanded from development banks to include pension funds.

For the energy efficiency finance world, the green bond market may offer opportunities to secure more flexible capital and expand the pool of investors interested in these loans. For instance, green bonds may offer PACE providers a vehicle for attracting new investors, particularly large pension funds such as Teachers Insurance and Annuity Association—College Retirement Equities Fund (TIAA–CREF), the leading retirement provider for people

who work in the academic, medical, and research fields. Doing so could allow for larger issuances, longer maturities, and perhaps better pricing. One element for financiers to consider is that green bonds may require a higher level of reporting than would come with more conventional debentures.

One of the issues facing the green bond market is the lack of specific criteria or universal certifications about qualification as a green bond. Ever since a parking garage was marketed to green bond investors, questions have emerged about how best to qualify uses of these instruments as green. Interestingly the parking structure in question actually had been certified as a green project by a reputable third party, but its green bond label still led to existential questions for the market. Questions about qualifications concern both the immediate use of proceeds and future ones, if funds are held in escrow while awaiting deployment.

A key aspect of the maturation of the green bond marketplace is the development of rigorous certification processes and outside opinions. This need for external validation may present an opportunity for the energy efficiency field. While green bonds could certainly boost efficiency finance offerings, the efficiency marketplace might also be in a strong position to assist the green bond industry. One potential opportunity is to use the existing evaluation processes within utility-led programs to ensure that the underlying assets reflect green investments. Projects assisted by and securing incentives from utility-sponsored new construction programs (also called design assistance offerings) would be of particular relevance. Since these projects are deemed more efficient than code and are certified as favorably influenced by utility-led programs, these assets would be good candidates for green bond offerings. To be successful these projects may have to be aggregated to achieve a scale adequate to meet issuers' requirements.

PROGRAM DESIGN AND DELIVERY

Beyond new ways to secure capital, another emerging issue concerns program design and enhancing the customer experience. As we have discussed in numerous sections of this paper, making it easier for the customer to participate and improving the overall customer experience are perhaps more critical than the cost, amortization period, or terms of any associated credit. This concern is perhaps seen most clearly in the efforts of large PACE providers such as Renew Financial and Renovate America to enhance customer satisfaction (C. DeVries, chief executive officer, Renew Financial, pers. comm., November 2, 2015; A. Matusiak, senior vice president for corporate development and new markets, Renovate America, pers. comm., November 6, 2015). Both are pouring significant resources into technology and have said that they employ as many computer programmers as lenders. These companies recognize the lesson from other efficiency segments that scale largely follows a familiar path: strong demand, ease of use, and leveraging an existing financing pathway. Only by building interest in the program through rigorous screening and training of contractors, providing a sophisticated IT platform that is easily navigated by customers and contractors alike, and having quick credit approvals will PACE and other fledgling energy efficiency finance programs continue to expand and reach their full potential.

Needs Going Forward

For growth to continue in the efficiency finance market, stakeholders will need to address several important issues.

EVALUATION

A key issue for the energy efficiency market relates to evaluation. Among the important questions evaluators are exploring are attribution and cost effectiveness. Attribution refers to whether the financing impacted decisions by customers to invest in efficiency. The primary concern for evaluators is determining if the investment would have occurred without the subsidy or involvement of the program. A unique question for financing programs is whether the associated loan is simply replacing alternative financing available in the marketplace or presents a new option. As discussed previously, answers to these questions can be complex.

In many instances, simply having another financing option, even one with better pricing, does not necessarily mean the project would have occurred without the financing program in place. The other loan could come with cumbersome requirements, or its proceeds could have been targeted for other uses by the borrower. It also may not be top of mind as decisions are made.

In other cases, the role financing plays in the overall customer experience and in closing the sale may be more critical than cost or availability. Ensuring that flexible and affordable capital is accessible at the time of the contractor visit is an important component in moving transactions forward. Even if a cheaper alternative is available, such as through a home equity loan, the sale is unlikely to move forward if the homeowner must take the initiative to apply, obtain an appraisal, and complete cumbersome paperwork. If the contractor can instead provide an attractive option before leaving the home, the sale is far more assured. Leaving the site when the sale has not occurred also significantly raises costs for the contractor and customer alike due to the need to reschedule the installation.

Another aspect of evaluation is the challenge of measuring cost effectiveness, particularly in determining the true cost of the loan. While some elements are reasonably straightforward, such as subsidies used for sales and operations or for loan servicing costs, others may be more opaque. For instance, if the loans come at a discount to market but are delivered through ratepayer contributions, it is not clear that a real subsidy exists. Certainly the borrower sees savings, but no cost to the ratepayer is evident since the funds ultimately will be returned, potentially even with interest. Determining the true cost of capital, especially when compared to the alternative of simply granting the funds, is worthy of more discussion and review.

CAPITAL ALLOCATION PROCESSES

Another focal area for efficiency finance is interest in embedding energy efficiency into the capital allocation process. As seen with green and efficient buildings, hybrid and electric cars, and ENERGY STAR–qualified IT equipment, the quickest path to scale is ensuring the selection of more energy-efficient options when capital decisions are made. Guaranteeing the prioritization of efficiency during these critical times will require a combination of forces, coming from both within and outside the organizations. Internally, creating policies

and expectations is critical, as are data, tracking, and reporting on the outcomes. Externally, whether through informal pressure such as benchmarking ordinances, stakeholder engagement, and capital market demand, or more formal requirements such as governmental decrees, organizations often need prodding to ensure that leadership and key managers focus on efficiency during capital events.

The amount of pressure needed is likely a function of the additional costs of efficiency and the ease with which efficiency can be brought into the capital process. For many segments embedding efficiency is easily accomplished, since the products come with low cost premiums, are considered a better value, and fit well within overarching sustainability goals. For others, such as the small commercial space, various elements are lacking, leaving efficiency out of decision-making processes. In these instances stakeholders must work together to find ways to prod the customer, ensure a seamless and simple process, and bring down the costs, whether real or perceived. Financing can play a role in making efficiency a priority, but simply adding a subsidized rate is not likely to result in a dramatic uptick in demand, nor provide a scalable solution. Financing programs can certainly support the growth but are not likely to lead it.

One area in which these elements may come together is through Strategic Energy Management programs and the emergence of interest in ISO 50001 certification (CEE 2014; Energy Trust Oregon 2015). Because these efforts focus on developing a comprehensive, strategic approach to efficiency, they can help align decision-making processes and ensure that efficiency is well integrated into capital decisions. Coupling these programs with finance offerings may further strengthen these efforts.

Conclusion

Since rebounding after the Great Recession, the energy efficiency finance market has expanded both in volume and in sophistication. Existing financing mechanisms now originate tens of billions annually, while emerging programs such as PACE are achieving significant scale.

Key elements for continued growth include ensuring that efficiency is better integrated into capitalization allocation processes, for example during initial construction or at recapitalization. As important is a greater focus on the customer experience and making it easier for customers to select efficient options. We also must continue to enhance their satisfaction with both the process and the outcome. Achieving greater customer satisfaction will require a more nuanced approach to evaluation and assigning value to the role that financing programs play in facilitating participation, outside of lowered interest rates or absent other financing options.

Key recommendations for supporting growth and maturation include

- Forging further ties between the energy efficiency finance and community development fields and exploring which tools developed for the socially responsible market are best suited for efficiency
- Exploring how to better use commercial PACE for the owner-occupied small commercial market and facilitating conversations about how the SBA can help to

support commercial PACE, while not undermining credit quality in the SBA portfolio
- Examining how to leverage existing government funds, such as in the Retrofit Ramp-Up program, to support underserved segments such as lower-rated states and municipalities
- Tapping the growing green bond market to add liquidity and new off-takers for efficiency loans

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