Growing the Pie? Assessing Financing's Achievable Savings Potential

Chris Kramer, Energy Futures Group

ABSTRACT

Across many jurisdictions, a key motivation for launching large-scale energy efficiency financing programs is to achieve greater energy savings than have been historically reached with other traditional program strategies. However, few jurisdictions have attempted to quantify the achievable potential that energy efficiency financing strategies can realistically be expected to contribute to overall savings goals. That trend, however, is beginning to change.

In recent years, leading jurisdictions, such as New York and California, have attempted to quantify the untapped market potential for energy efficiency financing. Critical methodological differences have emerged, such as whether and how these efforts have sought to estimate the level of savings that specific program designs might capture.

This paper highlights these various emerging approaches to quantifying the potential for energy efficiency financing programs, pointing out common themes as well as noteworthy distinctions. It also discusses certain "first efforts" to explore through potential studies (1) how financing might increase the total amount of achievable energy efficiency savings potential (i.e., how financing can "grow the pie"), (2) the amount of program-supported financing that might be appropriate to meet customer demand, which can help decision makers to size their financing programs, and (3) the total savings that financing could deliver for use in goal setting and performance evaluation. These concepts are relevant regardless of whether jurisdictions are conducting formalized potential studies or simply attempting to assess the potential of financing strategies in the regular course of program planning. Policymakers, regulators, and program administrators may be able to apply these concepts to help them set achievable savings targets for energy efficiency financing programs in their own jurisdictions.

Introduction

In recent years, the emergence of large-scale energy efficiency financing programs in a number of jurisdictions around the country has highlighted the need to develop prospective tools to incorporate financing into program planning (SEE Action 2015). Much of the work thus far that addresses the prospective potential of financing strategies has been focused on the total amount of capital that could be deployed if a broad range of energy efficiency opportunities were virtually all actually undertaken, supported by financing capital. This type of analysis is somewhat analogous to technical or economic potential studies of traditional energy efficiency programs, in that it examines the full scale of theoretical opportunity, in some cases incorporating certain basic constraints but generally not accounting for market barriers or the effectiveness of specific implementation strategies. This type of full-scale projection has sometimes been labeled the "*addressable*" potential for energy efficiency financing.

By contrast, other jurisdictions have looked at the "*achievable*" potential of energy efficiency financing, meaning a projection of the additional incremental savings that might be attributable to financing, above and beyond savings generated through other portfolio strategies.

These assessments are similar to achievable potential studies of traditional energy efficiency portfolios in that they forecast the level of efficiency that could be obtained when accounting for both market barriers and the potential effectiveness of program strategies in overcoming those barriers. One advantage of conducting this type of analysis is that it can provide a benchmark for establishing savings goals tied to specific programs being contemplated, while potentially informing budget allocations needed to support particular programs.

These different approaches have led to dramatically different bottom-line conclusions regarding the total potential of energy efficiency financing, as shown in the figure below. For example, while analysts in New York projected that an addressable potential of as much as $55 billion could potentially be deployed into energy efficiency projects in the state (Booz 2013, 15), analysts in California concluded that layering financing programs onto its energy efficiency portfolio would likely increase achievable energy savings by only three to five percent of the portfolio total (Navigant 2015a, 75).

Table 1. Comparing Approaches to Assessing Energy Efficiency Financing Potential

Jurisdiction	NY	CA
How study was labeled	"Addressable" Potential	"Achievable" Potential
What was projected?	Amount of *Capital* That Could Be Deployed	Amount of *Energy Savings* Achieved (Attributable to Financing)
Under what circumstances?	If all possible projects were completed today	In light of market barriers and likely participation in specific financing programs
Bottom-line conclusion	$55 billion could be deployed into energy efficiency financing	3 – 5% additional savings could be realized by layering financing onto portfolio

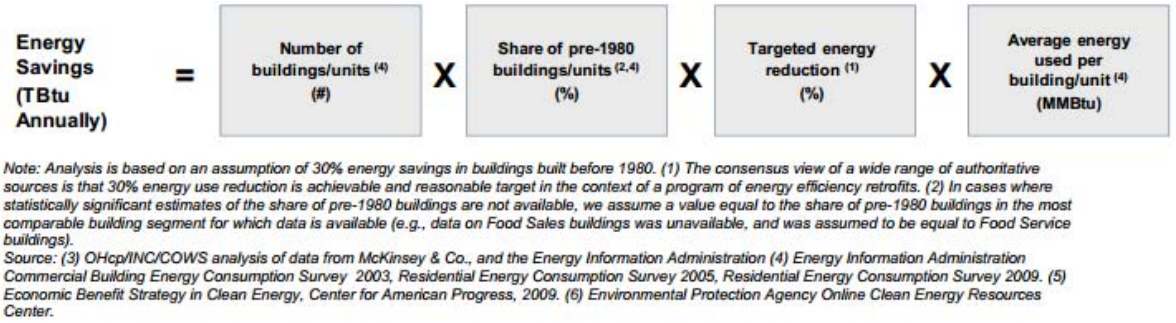
These conclusions are not necessarily inconsistent, as they attempt to estimate different things, i.e., the total dollar amount that could be deployed if nearly all addressable projects were completed, versus the actual amount of additional savings that could be expected by implementing certain specific financing programs. Nonetheless, the difference in scale of these conclusions may lead to very different types of conversations in terms of the level of emphasis that should be placed on financing as a portfolio strategy, as well as the budget allocations that should be directed toward financing within a given portfolio. For jurisdictions assessing the potential of energy efficiency financing in their own territories, it may be important to understand how these differences may impact the focus of their own program planning discussions.

The discussion that follows explores the methods and approaches that have been taken in recent studies and the conclusions that have been reached, in order to help policymakers and program administrators craft and interpret approaches to assessing financing's potential in their own jurisdictions. It should be noted that the conceptual issues regarding how potential is quantified are as applicable to informal assessments of energy efficiency financing's potential—done in the regular course of program planning—as they are to more formalized studies.

Theoretical Potential: United States

The theoretical maximum approach taken in New York bears some resemblance to an earlier foundational effort to address the total U.S. opportunity for capital deployment through energy efficiency financing in the joint study by Deutsche Bank and the Rockefeller Foundation, "United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models" (Rockefeller and Deutsche Bank 2012). The methodology used in this study, shown in Figure 1 below, examined energy consumption in the total building stock across all sectors in the United States built before 1980 and assumed a 30 percent energy reduction.

In essence, this methodology assumes 100 percent participation across every building in the United States built prior to 1980. While useful as a theoretical maximum, this number should not be misinterpreted as an estimate of the level of participation that might actually be achieved by implementing financing as a strategy to drive energy savings.



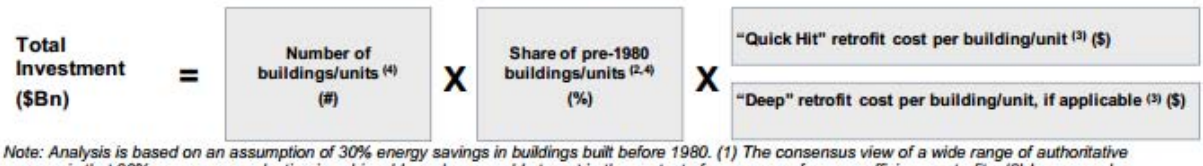
Note: Analysis is based on an assumption of 30% energy savings in buildings built before 1980. (1) The consensus view of a wide range of authoritative sources is that 30% energy use reduction is achievable and reasonable target in the context of a program of energy efficiency retrofits. (2) In cases where statistically significant estimates of the share of pre-1980 buildings are not available, we assume a value equal to the share of pre-1980 buildings in the most comparable building segment for which data is available (e.g., data on Food Sales buildings was unavailable, and was assumed to be equal to Food Service buildings).
Source: (3) OHcp/INC/COWS analysis of data from McKinsey & Co., and the Energy Information Administration (4) Energy Information Administration Commercial Building Energy Consumption Survey 2003, Residential Energy Consumption Survey 2005, Residential Energy Consumption Survey 2009. (5) Economic Benefit Strategy in Clean Energy, Center for American Progress, 2009. (6) Environmental Protection Agency Online Clean Energy Resources Center.

Figure 1: Deutsche Bank/Rockefeller Savings Potential Methodology. *Source*: Rockefeller and Deutsche Bank 2012.

The study also assumes that all of the costs of energy efficiency will be supported through financing strategies. As shown in Figure 2 below, the "capital required to finance retrofit measures" is assumed to be equivalent to 100% of the costs of those retrofits. In other words, the study treats total costs and required financing capital broadly as one and the same.

The capital required to finance the retrofit measures that would result in the energy savings described above was calculated for each segment using the following methodology:

Figure 14: Summary of investment potential methodology



Note: Analysis is based on an assumption of 30% energy savings in buildings built before 1980. (1) The consensus view of a wide range of authoritative sources is that 30% energy use reduction is achievable and reasonable target in the context of a program of energy efficiency retrofits. (2) In cases where statistically significant estimates of the share of pre-1980 buildings are not available, we assume a value equal to the share of pre-1980 buildings in the most comparable building segment for which data is available (e.g., data on Food Sales buildings was unavailable, and was assumed to be equal to Food Service buildings). Source: (3) OHcp/INC/COWS analysis of data from McKinsey & Co., and the Energy Information Administration (4) Energy Information Administration Commercial Building Energy Consumption Survey 2003, Residential Energy Consumption Survey 2005, Residential Energy Consumption Survey 2009. (5) Economic Benefit Strategy in Clean Energy, Center for American Progress, 2009. (6) Environmental Protection Agency Online Clean Energy Resources Center.

Figure 2: Deutsche Bank/Rockefeller Capital Requirement Methodology. *Source*: Rockefeller 2012.

Treating total theoretical costs and required financing capital as equivalent may be useful from the broad perspective of overall market sizing. From a program planning perspective, however, it may be important not to treat this type of estimate as a projection of actual likely participation levels in specific financing programs that might be contemplated, as doing so could potentially lead to an overestimate of the proportion of typically limited energy efficiency program budgets that might need to be directed toward financing programs.

To some extent, the Deutsche Bank/Rockefeller study acknowledges qualitatively both the important market barriers that can hinder the deployment of energy efficiency financing, as well as the limitations on financing strategies to overcome those barriers. For example, with regard to market barriers in the single-family residential sector (which represents just over half of the total $279 million potential cited in the study), the authors observe:

> "[T]here are at least two main challenges associated with market development in this segment. The first is the extreme fragmentation that exists within the single family market, which results in fragmented demand that is difficult to aggregate. The second is the relatively low level of effective demand, which is only likely to be addressed through strong regulatory requirements, retail consumer engagement strategies and/or other significant non-financial interventions" (Rockefeller and Deutsche Bank 2012, 15).

The study further acknowledges that financing may be only one strategy to help overcome market barriers and reach the full extent of market opportunity. For example, "Many of the barriers that exist to scaling energy efficiency retrofits in the United States could be addressed through enabling local and national policy and regulation" (Rockefeller and Deutsche Bank 2012, 11). They suggest a number of non-financing solutions that could "dramatically speed" the scaling process, including mandated energy efficiency targets, energy usage benchmarking and disclosure requirements, leadership by example at various levels of government, and incentives and guarantees (Rockefeller and Deutsche Bank 2012, 11).

These caveats regarding market barriers and the limitations of financing strategies to overcome them are not, however, quantified in the study in terms of their potential impact on capital deployment. Thus, the only quantified level of financing potential capital deployment that the study presents is the full $279 billion of capital deployment. It may be important for policymakers and program administrators to understand this type of figure as a theoretical maximum, which may not directly inform achievable estimates of savings potential attributable to specifically contemplated financing strategies or budget allocations needed to support those strategies. As discussed in the next section, these issues of interpretation can potentially impact discussions of financing program development and budgetary support for financing programs within the context of energy efficiency program planning.

Addressable Potential: New York

The potential of energy efficiency financing has been a key issue in New York at least since the launch of its Green Bank in 2013. In September of that year, NYSERDA petitioned the New York Department of Public Service for an initial capitalization of approximately $165 million (NYSERDA 2013a), which was followed by a subsequent petition in October 2014 for

full capitalization at a level of $1 billion (NYSERDA 2014). While the $1 billion figure was not drawn directly from a potential study, NYSERDA did cite an analysis by Booz & Company that pointed to an "addressable" potential capital deployment of approximately $85 billion, including $55 billion of energy efficiency. In its initial petition for a $1 billion ratepayer capitalization, NYSERDA acknowledged that the Booz estimate "does not attempt to identify a technical potential or market achievable potential for energy efficiency or renewable energy, but rather seeks to identify a theoretical maximum market potential in order to provide context for the current Green Bank capitalization plan" (NYSERDA 2013a, 6).

The theoretical maximum arrived at in the Booz report largely assumes "that all potential investments are made" (NYSERDA 2013a, 6). In other words, it does not account for likely participation levels in light of market barriers or the likely uptake of particular financing programs as designed and implemented.

As shown below, the initial estimate of the size of the energy efficiency financing market is derived from an estimate of total building stock (pre 2008 or 2009, depending on the sector) multiplied by estimated retrofit cost per unit or square foot. This amount ($78.1 billion) essentially represents a rough estimate of the full universe of untapped energy efficiency projects across the entire building stock.

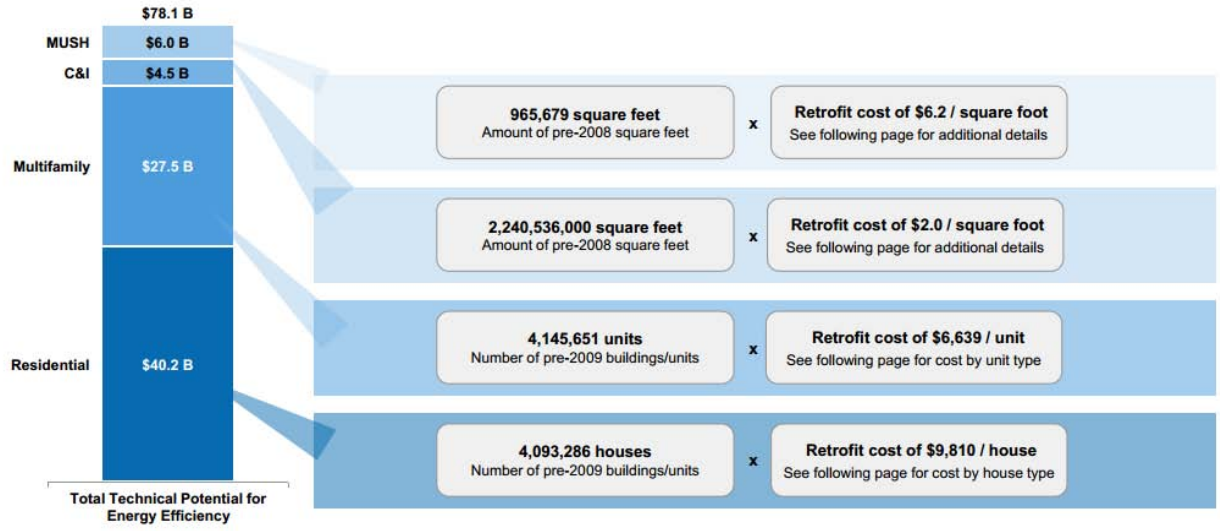


Figure 3: Booz Technical Potential Methodology. *Source*: Booz 2013.

The report's final estimate of $55 billion for energy efficiency financing is in fact a subset of what Booz considered to be a "total technical potential" of $78.1 billion. The Booz report describes the $55 billion as the "addressable" potential, arrived at only after "removing the un-addressable and addressed potential from the total technical potential" of $78.1 billion (Booz 2013, 41). Yet while the "un-addressable" and "addressed" portions of the market were removed, the analysis did not attempt to estimate the size of the remaining market that might actually participate in energy efficiency financing programs, savings levels that might be achieved from this participation, or budgetary allocations that might be needed to support such programs. As

such, NYSERDA still described the $55 billion estimate as an "upper bound of investment potential" (NYSERDA 2013, 6).

Although this estimate was not directly related to the amount of achievable potential that might be reached via particular financing programs, or the budget allocations that might be needed to implement such programs, NYSERDA nonetheless cited the estimate in calling for a $1 billion allocation for its Green Bank, noting:

> "Booz has developed a directional estimate of the potential addressable investment of $85 billion over the next ten years. Due to initial private sector leverage, and the recycling of the Green Bank's capital, the Booz report projects that an initial $1 billion NYGB capitalization will lead to as much as $8 billion of additional private sector investment in clean energy projects over the next ten years… which would represent approximately 10% of the $85 billion potential addressable market" (NYSERDA 2013a, 7).

Certain stakeholders, however, raised questions in the course of the regulatory proceedings on the Green Bank capitalization regarding the lack of an achievable potential analysis. For example, the City of New York and the New York Energy Efficiency Corporation (NYCEEC), which provides financing for energy efficiency improvements in New York City, submitted the following comments:

> "NYCEEC and the City are concerned that the proposed capitalization level of $1 billion is supported primarily by a ***theoretical*** estimate of the 'upper bound of investment potential,' and not by an estimate of the market-achievable potential for investment. In NYCEEC's experience, there currently is not $5.5 billion of annual market demand (i.e., $55 billion over 10 years…) for energy efficiency projects in New York State. This is based on the level of demand that NYCEEC has experienced directly (not theoretically) for its various financing offerings" (NYCEEC 2013, 13, emphasis in original).

NYCEEC further explained its underlying concern regarding the lack of an achievable potential analysis, noting, "If the Green Bank is capitalized at a level that exceeds some reasonable estimate of actual market potential by a material amount, then it risks locking up for an extended period of time limited capital resources that otherwise could be used to incentivize the development of renewable energy and energy efficiency projects" (NYCEEC 2013, 13).[1]

NYSERDA's reply comments acknowledged that the Booz estimate "did not attempt to identify a current market-achievable potential for energy efficiency or renewable energy, but rather to identify a conservative long term market addressable potential, in order to provide context for the current Green Bank capitalization plan." The reply asserted that a $1 billion capitalization, which Booz estimated would lead to as much as $8 billion of additional private

[1] It may be worth noting that NYSERDA did publish a recent achievable potential study, but that analysis focused principally on achievable potential energy savings using non-financing strategies. The study treated access to financing as only one among a wide range of market barriers and did not attempt to quantify the specific impact that financing might have on overall achievable savings potential (Optimal Energy 2014, 15-16).

sector investment, was well supported in that it represented "approximately 10 percent of the $85 billion potential market calculated by Booz" (NYSERDA 2013b, 3).

In reviewing the NYSERDA full capitalization request, the New York Public Service Commission agreed to approve an additional $150 million on top of its initial capitalization request, bringing total approval to over $300 million, but did not initially agree to approve the full $1 billion capitalization. In its order, the PSC cited the "prospect of overcapitalization resulting in an excessively large balance of ratepayer funds" being held by the Green Bank as a primary concern in initially declining to approve the full $1 billion capitalization (NYPSC 2015a, 12).

In light of these concerns, NYSERDA ultimately revised its capitalization request in a supplemental filing, extending the time period of the requested $1 billion capitalization from four years to ten, which significantly reduced the budgeted ratepayer allocations that would be directed toward Green Bank capitalization each year. In making this change, NYSERDA acknowledged it was "cognizant of the feedback received" in connection with proceedings related to the Green Bank, as well as the importance of continued support for non-financing programs to "work in tandem to deliver the combined benefits" of financing and non-financing efforts. In view of these considerations, NYSERDA characterized its revised request for capitalization over an extended timeframe as a "significant easing" of the transition to a Green Bank ramp up (NYSERDA 2015, 163).

At the same time, NYSERDA also requested approval to secure a line of credit upon which it could potentially draw as needed if its capital needs exceeded the level of capital made available via ratepayer collections over an extended timeframe. NYSERDA suggested that this approach, in which funds would only be drawn as the need for them actually arose, would allow the Green Bank "to access capital consistent with its business plan and projected market needs" (NYSERDA 2015, 164). NYSERDA noted that this approach was "directly responsive to many of the comments received throughout the [Green Bank related] proceedings expressing concern where ratepayer monies may be collected but not utilized immediately" (NYSERDA 2015, 167).

Acknowledging the creativity of this revised approach, the New York Public Service Commission ultimately approved NYSERDA's revised capitalization request. The actual need for capital will be observed over time.[2]

One takeaway from the experience in New York may be that starting with a projection of total market size as way of estimating capitalization needs for financing programs may in some cases raise concerns among stakeholders or regulators about the risk of overcapitalization. In certain instances, this approach may also raise related concerns regarding under-budgeting for complementary programs, if capitalization of financing programs is accompanied by a reduction in budgets for other programs, as has been approved in the case of NYSERDA. Citing stakeholder feedback, however, NYSERDA ultimately "eased" its capitalization request by extending it over a longer timeframe, slowing the pace of budget reductions in other areas, and proposing to capitalize the Green Bank in part with a line of credit that could be drawn upon only when market demand actually materialized (NY PSC 2015b, 15-19).

While there is no way to know for certain, it is possible that an alternative approach to estimating financing potential, looking at actual likely capital deployment in light of market

[2] Even if the full capitalization is ultimately used, however, it remains somewhat uncertain what level of additional attributable savings this activity may generate, a figure that the Booz study did not attempt to quantify.

barriers, may have raised fewer concerns regarding possible overcapitalization. Moreover, an approach that examined not only capital deployment, but also attributable savings that might result from such deployment, may have provided a useful estimate of the ultimate value of directing ratepayer funds toward Green Bank capitalization. The next example looks at an alternative means of projecting financing's achievable savings potential in light of market barriers and estimated savings attribution.

Achievable Potential: California

California's achievable analysis of energy efficiency financing was conducted as a part of the state's overall "2013 California Energy Efficiency Potential and Goals Study" and was updated as part of the same type of study in 2015 (Navigant 2014, 2015b). According to the study's authors, it was "the first potential study known to include financing as a driver of energy efficiency savings" (Navigant 2014, 146). As such, they acknowledged, "Currently, there are no established best practices to incorporate financing into EE potential models" (Navigant 2014, 81). Under these circumstances, the authors devised their own methodology to assess the achievable potential of energy efficiency financing. This example is included here to illustrate one possible way of conducting this type of analysis, but it is hoped that this discussion will also generate further conversation regarding the best methods to apply in the future.

An important difference between this study and those reviewed above is that the achievable potential assessed in California was not the amount of capital that could potentially be deployed, but rather the additional potential energy savings that could be realized by introducing effective financing programs. Using energy savings as the forecasted metric brings this study more in line with traditional energy efficiency potential studies, which generally focus on the level of energy savings that may be realized under various scenarios.

The method used in the Navigant study to determine achievable potential energy savings realized via energy efficiency financing was based upon the use of an implied discount rate (abbreviated in the study as "iDR"). In essence, the discount rate was used as a proxy for determining the relative strength of pure economic benefits in driving participation and savings levels: the greater the combined market barriers, the more the discount rate would weaken the ability of pure economic benefits to drive participation.

The authors began with a typical consumer economic discount rate and "built up" an implied discount rate that incorporated the full range of these perceived risks or market barriers, as shown below. As a result, participation rates still varied along with the customer benefit-cost ratio, but the ratio was reduced or increased by the relative size of the combined market barriers incorporated into the implied discount rate. Access to financing was treated as one of several discreet market barriers making up the implied discount rate. Reducing this barrier by implementing financing programs was projected to bring down the implied discount rate, which in turn would increase the benefit-cost ratio and drive up corresponding participation and savings levels.

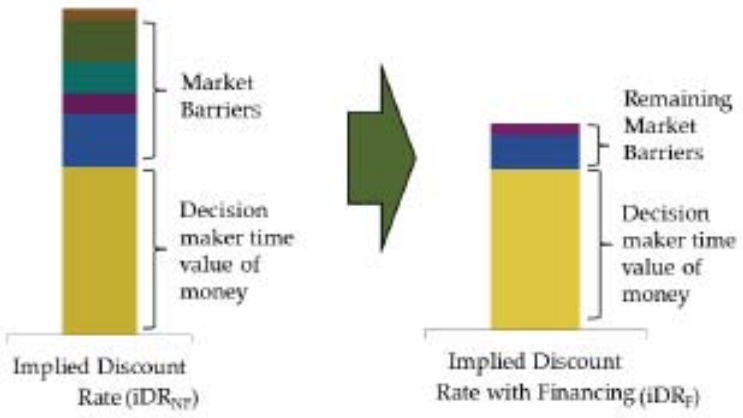


Figure 4: Reduction in iDR Resulting from Introduction of EE Financing. *Source*: Navigant 2013.

Once the new discount rate was determined, analysts re-ran their achievable potential savings model using the lower discount rate to determine a new overall level of achievable savings. As shown in the figure below, "The difference in output in the two model runs" (without financing and with financing) "determines the incremental impact of EE financing" on adoption rates (Navigant 2014, 86).[3]

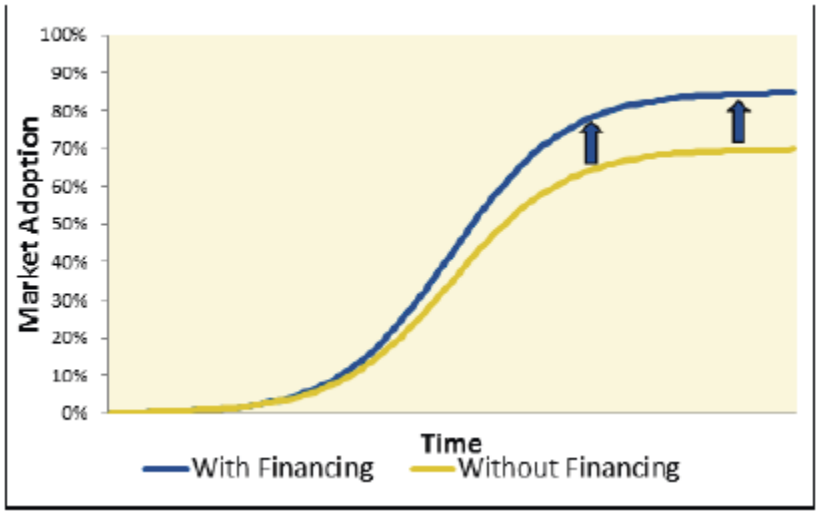


Figure 5: Effect of Introducing Financing on Market Adoption

[3] This same methodology could potentially be applied in future potential studies in New York. The most recent NYSERDA achievable potential study (which examines the entire portfolio of energy efficiency programs, rather than financing only) also makes use of an implied discount rate, but only for purposes of reducing the value of future benefits to a greater degree than a lower economic discount rate would, in recognition of the tendency of customers to value shorter-term benefits over longer-term ones (Optimal Energy 2015, 7-8). In theory, future estimates could potentially be made of the extent to which reducing the financing barrier, and perhaps other market barriers, might lower this implied discount rate and increase participation rates.

Ultimately, the initial study indicated that the "incremental savings potential due to financing is modest," a conclusion that was also reached in the 2015 update, as shown in the figure below.

» Financing increases the 2016 incremental electric savings potential by 3% while increasing the 2016 incremental gas savings potential by 5%.

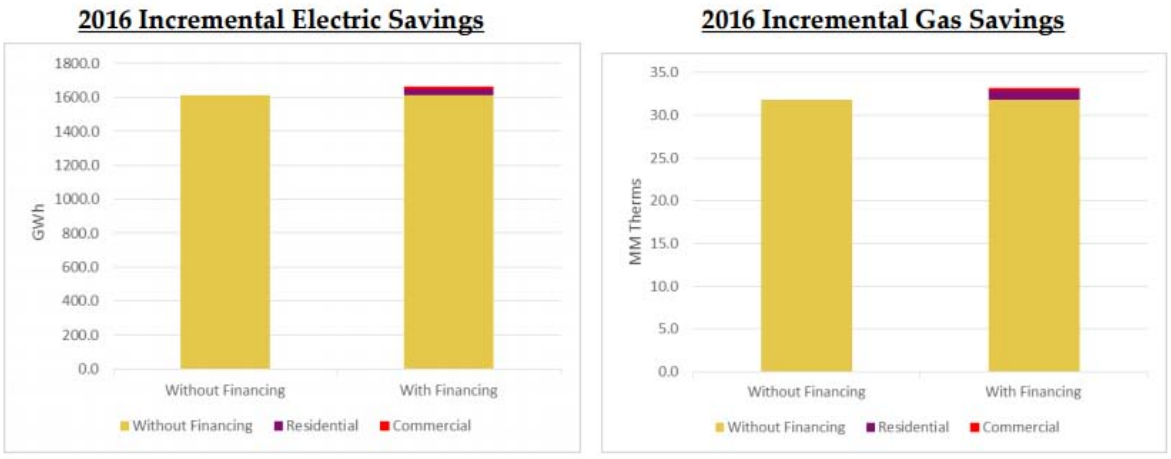


Figure 6: Projected Incremental Savings Potential Attributable to Financing in CA. *Source*: Navigant 2015.

Some of the reasons for the modest incremental savings potential related to limited eligibility for proposed financing programs in the commercial and multifamily sectors, while other factors were tied to the relatively limited influence of the financing barrier on the overall implied discount rate. The estimate of financing's impact on the implied discount rate was based on a range of sources. These included past survey results, observations from financing programs in California and other states, expert interviews, literature research, and a process evaluation of California's small business On-Bill Financing Program. Examples of findings from this research and analysis included the following:

- Financing may enable, rather than drive, demand. Analysts "reviewed financing initiatives across the United States" and found that "financing has been perceived as an enabler of demand rather than a driver of demand" (Navigant 2014, F-5).
- Program design parameters may impact saving and participation rates. For example, analysts noted that program eligibility limitations based on creditworthiness, as well as targeting of limited market sub-segments (e.g., affordable housing only within the multifamily sector), limited the projected impact of proposed financing programs on overall statewide savings potential. Analysts also noted that "the interest rates for the pilot programs are similar to traditional loans," further contributing to the "moderate results for financing" (Navigant 2014, 149).
- Even within financing programs, financing alone may not overcome all barriers. In reviewing California's pre-existing On-Bill Financing (OBF) program, for example,

analysts found “EE financing may not fully address all of the market barriers identified as drivers to participation in the OBF program” (Navigant 2014, F-14).

- Private financing may be readily available to customers in some markets. For example, analysts noted, “single-family customers have easy access to financing through credit cards for small-size retrofit purchases” (Navigant 2014, 149).
- Financing itself may sometimes introduce additional market barriers. For example, analysts noted the “potential hassle factor associated with any application process to obtain financing” as an additional market barrier that financing programs might introduce (Navigant 2015b, 149).

Incorporating these types of qualitative observations into a quantitative projection of financing’s impact on energy savings may have required a certain degree of judgment. As with any achievable potential study, the specific numerical projections should be interpreted as an informed estimate, with room for discussion and interpretation. This may be even more true given that the California study represented a first effort to estimate financing’s achievable potential.

The purpose of highlighting this study, however, is not to endorse or critique the numerical results, but rather to distinguish the overall framework within which results were produced from that of the other studies described above, such as the New York study. Unlike these other studies, the California study applied an achievable framework that accounted for a wide range of both financing and non-financing-related market barriers and projected incremental participation and savings levels in light of the potential impact of actual envisioned financing programs on these barriers. This type of framework may be more appropriate for making financing-related program design decisions and related budget allocations than a broader approach to overall market sizing.

In addition, it is worth noting that in contrast to other studies described above, the final projections from this study were stated in terms of attributable savings that could potentially be achieved. Other financing potential studies have tended to examine only how much capital can potentially be deployed into the energy efficiency market. An achievable potential assessment that focuses on the question of what level of additional attributable energy efficiency savings may be generated may help inform key energy efficiency policy and program planning questions.

Conclusion

A limited number of early efforts to estimate the potential of energy efficiency financing have been completed to date. These studies have varied in their methodological approaches, with important differences in the type of information they provide and the ways in which they should be interpreted.

For example, a national study and a New York-specific study focused on the investment levels that might be needed if the vast majority of technically feasible energy efficiency upgrades were completed. These studies offer a useful upper bound for the investment required if energy efficiency activity were to dramatically scale up to near 100 percent participation. However, these studies do not attempt to quantify—and should not be misunderstood as offering—an estimate of the investment needed under current market conditions, accounting for observed or likely levels of demand, consumer preferences, or market barriers. Moreover, they do not attempt

to project results in terms of attributable savings that might result from implementing specific financing programs.

By contrast, studies conducted for California have attempted to quantify the additional energy savings that could be realized if financing were added to existing energy efficiency program offerings. The exercise "found that incremental savings potential due to financing is modest," a result based on the specific parameters of proposed financing programs, as well as a review of multiple sources that placed the magnitude of financing's projected impact within the context of a wide range of market barriers.

While both approaches offer useful information, state policy makers and regulators and energy efficiency program administrators should distinguish between theoretical investment maximums and achievable savings potential analysis when designing financing programs in their jurisdictions. These distinctions should be kept in mind whether jurisdictions are conducting formal potential studies of their own, or simply attempting to informally assess the potential role and impact of energy efficiency financing within the range of strategies they may employ.

References

Booz (Booz & Company). 2013. *New York State Green Bank Business Plan Development: Final Report.* Prepared at the request of NYSERDA and submitted to the New York Public Service Commission. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=98041&MatterSeq=43577

Navigant. 2014. *2013 California Energy Efficiency Potential and Goals Study*. Prepared for the California Public Utilities Commission. Walnut Creek, CA: Navigant Consulting, Inc. www.cpuc.ca.gov/General.aspx?id=2013

———. 2015a. *2015 California Potential and Goals Study: Draft Results Presentation to DAWG*. www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5251

———. 2015b. *Energy Efficiency Potential and Goals Study for 2015 and Beyond: Stage 1 Final Report*. Prepared for the California Public Utilities Commission. San Francisco, CA: Navigant Consulting, Inc. www.cpuc.ca.gov/General.aspx?id=2013

NYCEEC (City of New York, New York City Energy Efficiency Corporation). 2013. *Initial Comments of the City of New York and the New York City Energy Efficiency Corporation*. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=102749&MatterSeq=43577

NY PSC (State of New York Public Service Commission). 2015a. *Order Approving Additional Capitalization with Modification for New York Green Bank*. Matter No. 13-01875. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=144162&MatterSeq=43577

———. 2015b. *Order Authorizing the Clean Energy Fund Framework*. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=153127&MatterSeq=43577

NYSERDA. 2013a. *Petition of New York State Energy Research and Development Authority to Provide Initial Capitalization for the New York Green Bank.* Submitted to the New York Public Service Commission. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=98041&MatterSeq=43577

———. 2013b. *NYSERDA Reply Comments*. Submitted to the New York Public Service Commission. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=104144&MatterSeq=43577

———. 2014. *New York Green Bank: Petition to Complete Capitalization of NYGB*. Submitted to the New York Public Service Commission. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=130900&MatterSeq=43577

———. 2015. *Clean Energy Fund Information Supplement*. Submitted to the New York Public Service Commission. Matter No. 13-01875. Case No. 13-M-0412. documents.dps.ny.gov/public/MatterManagement/MatterFilingItem.aspx?FilingSeq=143916&MatterSeq=43577

Optimal Energy, Inc. 2014. *Energy Efficiency and Renewable Energy Potential Study of New York State. Volume 1: Study Overview. Final Report*. Albany, NY: NYSERDA. www.nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/EERE-Potential-Studies

———. 2015. *Energy Efficiency and Renewable Energy Potential Study of New York State. Volume 2: Energy Efficiency Methodology and Detailed Results. Final Report.* Report No. 14-19. Albany, NY: NYSERDA. www.nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/EERE-Potential-Studies

Rockefeller and Deutsche Bank (The Rockefeller Foundation and DB Climate Change Advisors, Deutsche Bank Group). 2012. *United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models.* www.rockefellerfoundation.org/report/united-states-building-energy-efficiency-retrofits/

SEE Action (State and Local Energy Efficiency Action Network). 2015. *Making It Count: Understanding the Value of Energy Efficiency Financing Programs Funded by Utility Customers*. https://www4.eere.energy.gov/seeaction/publication/making-it-count-understanding-value-energy-efficiency-financing-programs-funded-utility