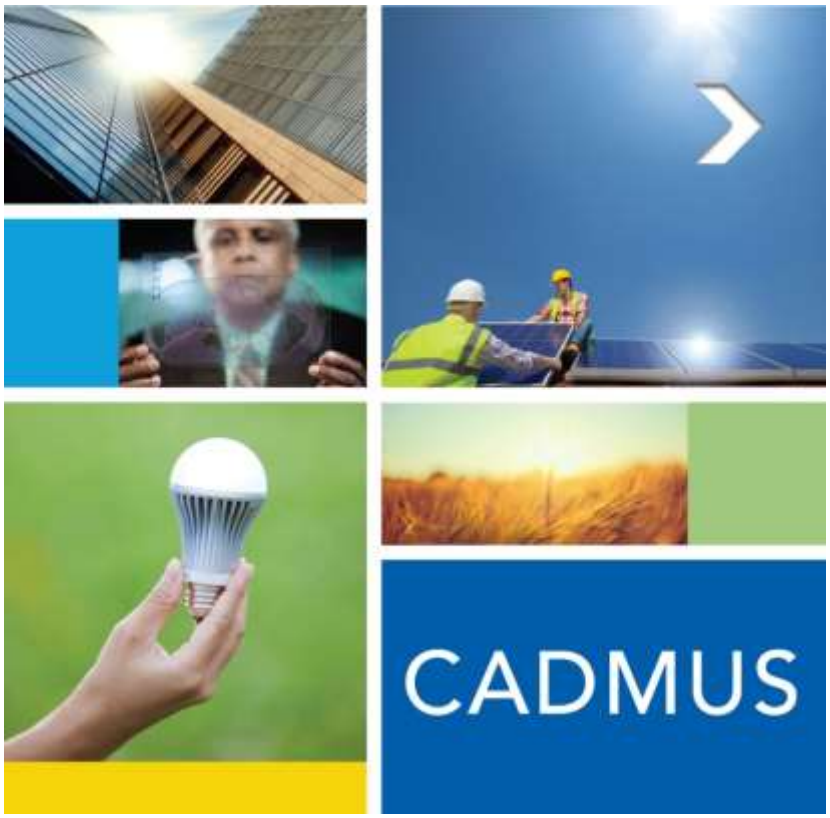

Large Commercial and Industrial On-Bill Repayment Program Evaluation

September 20, 2016

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Providence, Rhode Island

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Executive Summary

To encourage large commercial and industrial customers to make energy efficiency upgrades, National Grid Rhode Island (National Grid) offers prescriptive rebate incentives, rebate incentives for custom projects, and, for select customers perceived by the Commercial and Industrial (C&I) sales representative to need assistance beyond the rebates, 0% financing that can be repaid as a line item on their utility bills.

National Grid commissioned this study to evaluate the financing component of their large commercial and industrial (LCI) energy efficiency program. Cadmus evaluated the program design, performance, and sustainability; the overall market for the program; and the program's penetration of that market to date.

Cadmus relied on the following primary and secondary data for its analysis:

- On-bill repayment (OBR) participant tracking data from January 2014 through March 2016
- The National Grid C&I customer database
- Interviews with National Grid program and C&I Sales Team staff (3); project expeditors (2); National Grid legal counsel (1); and the Rhode Island Department of Business Regulations staff (1)
- A participant survey (25 completes)
- A market assessment survey of rebate-only LCI participants (35 completes) and LCI nonparticipants (35 completes)

Findings

Program Design and Performance

Cadmus found that the OBR program has an efficient design, with limited actors participating in its implementation. There is no formal documentation of the program, nor is there a formal application process. However, National Grid staff are sufficiently engaged with each customer that the process to apply for the funds, complete the project, and fund the project do not present any barriers to customers, nor do they add undue time or effort relative to receiving only a rebate. The method of promotion does present a barrier to customers in that most are not aware of the program's existence. This barrier is by design because program staff want to carefully control access to the limited available funding.

The program does not have set participation or savings targets and, according to staff, there is some uncertainty each year as to whether the program will receive additional funds. As a result, staff indicated that in any given year they expend only about half of the available funds to ensure sufficient funds are available for the following year.

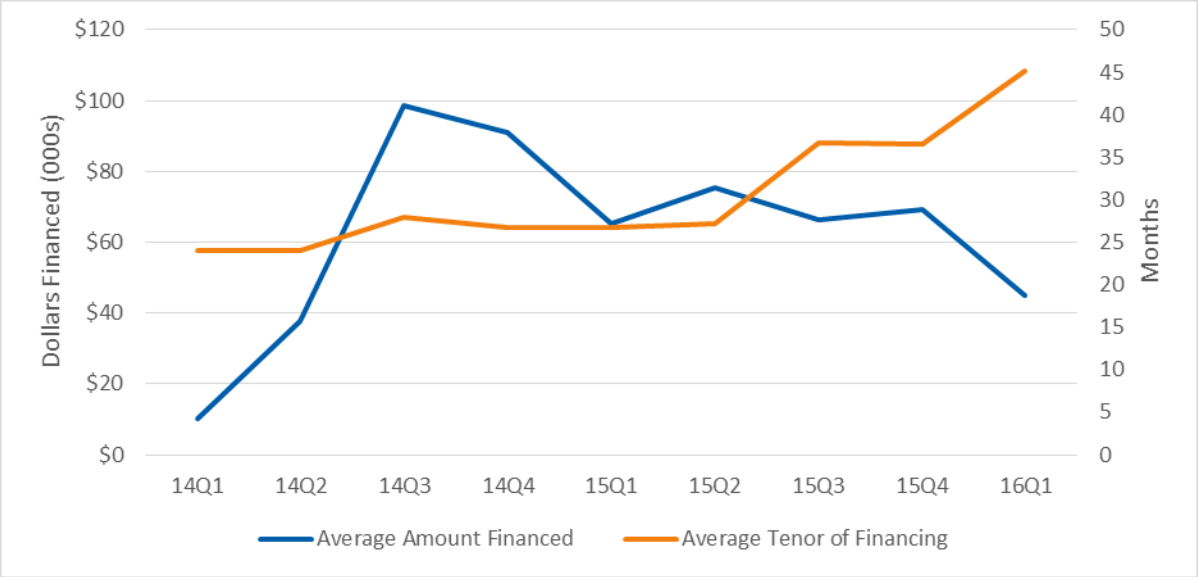
Participation in OBR has been steadily increasing on pace with a steady increase in annual allocations to the revolving loan fund (Table 1).

Table 1. OBR Program Participation, January 2014–March 2016

Year	Quarter	Number of Projects Financed	Total Loan Volume
2014	Jan - Mar	6	$93,491
	Apr - Jun	9	$339,304
	Jul - Sep	12	$1,184,671
	Oct - Dec	22	$2,000,337
2015	Jan - Mar	13	$848,357
	Apr - Jun	15	$1,132,264
	Jul - Sep	18	$1,195,200
	Oct - Dec	40	$2,775,587
2016	Jan - Mar	30	$1,351,030
Total		**165**	**$10,920,241**

Despite the increase in the maximum tenor in 2015, which should make larger projects easier to afford by reducing the monthly payment, the average financing amount per project has been relatively stable. However, as shown in Figure 1, the average tenor has been increasing, from 25 months in early 2014 to 45 months in the first quarter of 2016. This indicates that customers are installing similar projects, but making lower monthly payments. The increased tenor may be a factor in the increasing participation, however.

Figure 1. Average Financing Amount and Average Tenor, 2014–2016



Participants and Projects

Cadmus found that schools and other educational buildings were the most common type of facility improved using OBR funds, representing 39% of OBR projects. Government buildings and manufacturing, the second and third most common types of facilities, respectively, made up another 40% of projects. These are also among the largest customer sectors, indicating that their participation is proportional to the size of the customer sector. On the other hand, although retail and small office customers make up the second and third largest groups in the customer base (see Table 21), they rarely, if ever participate, possibly due to the large number of these spaces that are leased.

Over the period examined in this study, customers installed 1,160 individual measures across 165 projects. Lighting upgrades were the most common measure installed, followed by custom projects (Table 2). The proportion of measures installed was stable from 2014 through the first quarter of 2016, despite the change in maximum tenor (which could allow projects with longer paybacks to be more affordably financed).

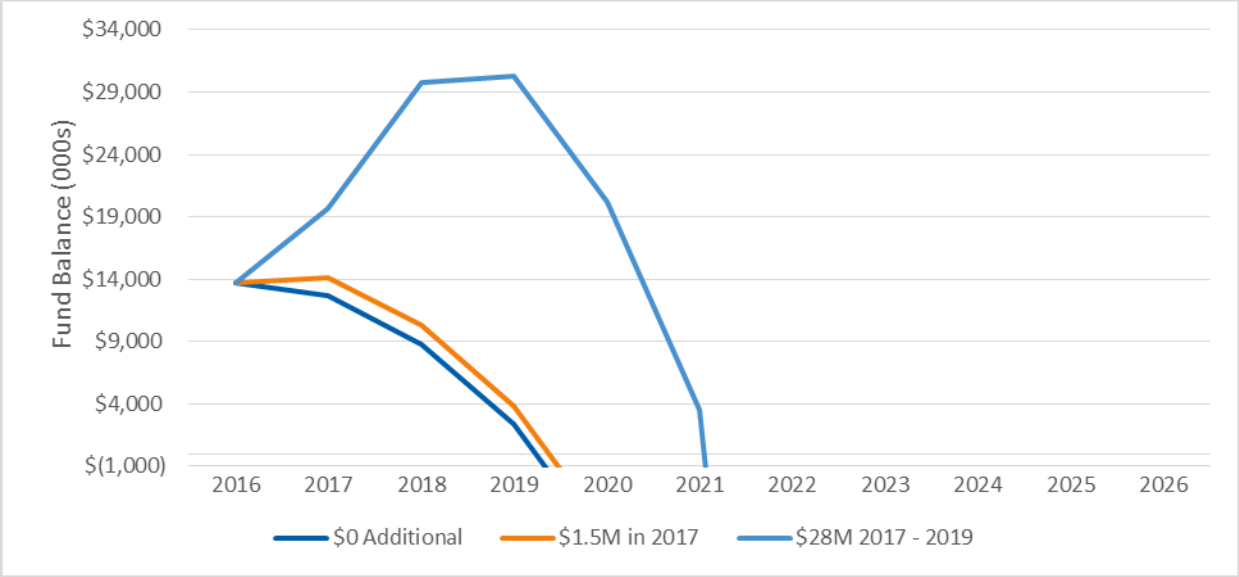
Table 2. OBR Measure Count by Measure Subprogram

Year	Lighting Measures	Custom Measures	HVAC Measures	VFD Measures	Total OBR
2014	93%	6%	1%	1%	100%
2015	90%	4%	0%	5%	100%
2016 (Q1)	95%	5%	0%	0%	100%
Total OBR	**92%**	**5%**	**0%**	**3%**	**100%**

Fund Sustainability

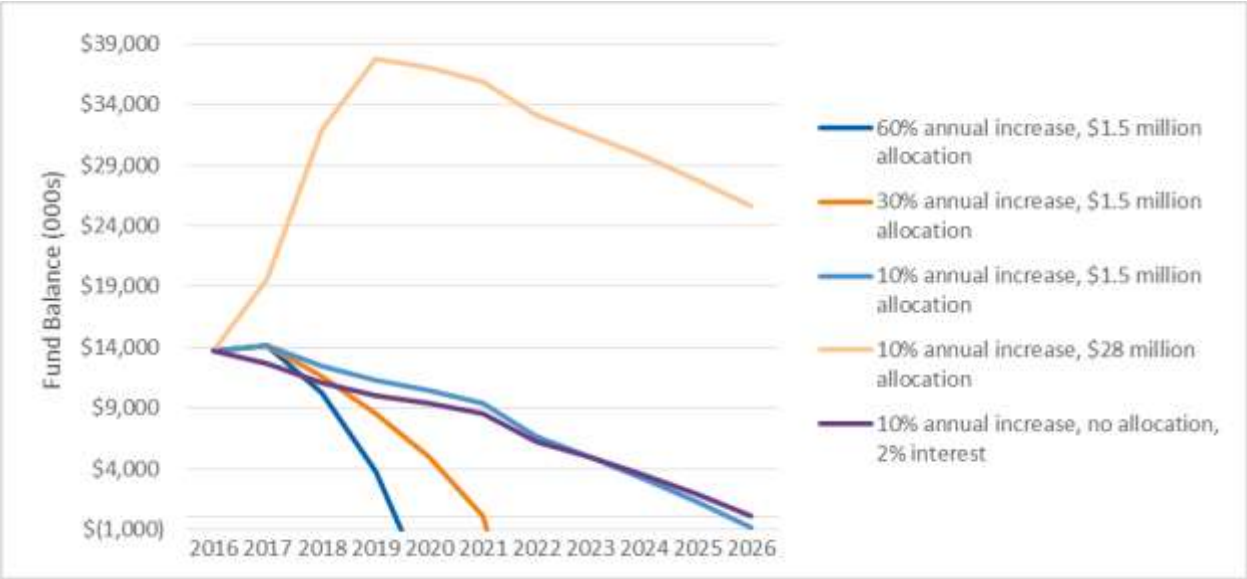
Cadmus assessed the ability of the fund to remain solvent over a 10-year window under a number of different funding and participation scenarios, as well as increased interest rates. Our analysis showed the most significant factor affecting fund sustainability is the rate of growth in annual participation. If the fund continues to grow at the rate it has exhibited since 2014, about 60% each year, then even at the upper end of estimated possible allocations to the fund ($28 million over three years), the fund will reach a $0 balance by 2021. Figure 2 shows the fund balance reaching $0 in 2019 with no additional funding, just a few months later with a single allocation of $1.5 million, and in 2021 with allocations totaling $28 million over three years.

Figure 2. Fund Sustainability with 60% Participation Growth and Varying Funding Levels



However, while there is the potential to grow participation, if needed the program manager and the C&I Sales Team could control the rate of increase in participation. Assuming a 10% increase in participation year over year, with a single allocation of $1.5 million in 2017, the fund will last for almost the full 10-year period. With no allocation, but a charge of 2% interest, the balance in 2026 is slightly higher than with an allocation of $1.5 million but 0% interest, but the revenue into the fund from the interest charge is not sufficient to maintain the program (Figure 3).

Figure 3. Fund Sustainability at Different Participation Increase Rates



Participant Experience

The participant survey provided data on participant motivations for completing a project, perceptions of the rebate incentive and financing offers available from National Grid, and satisfaction with their program experience. Survey results showed that rebates and financing affected customer decision-making in different ways.

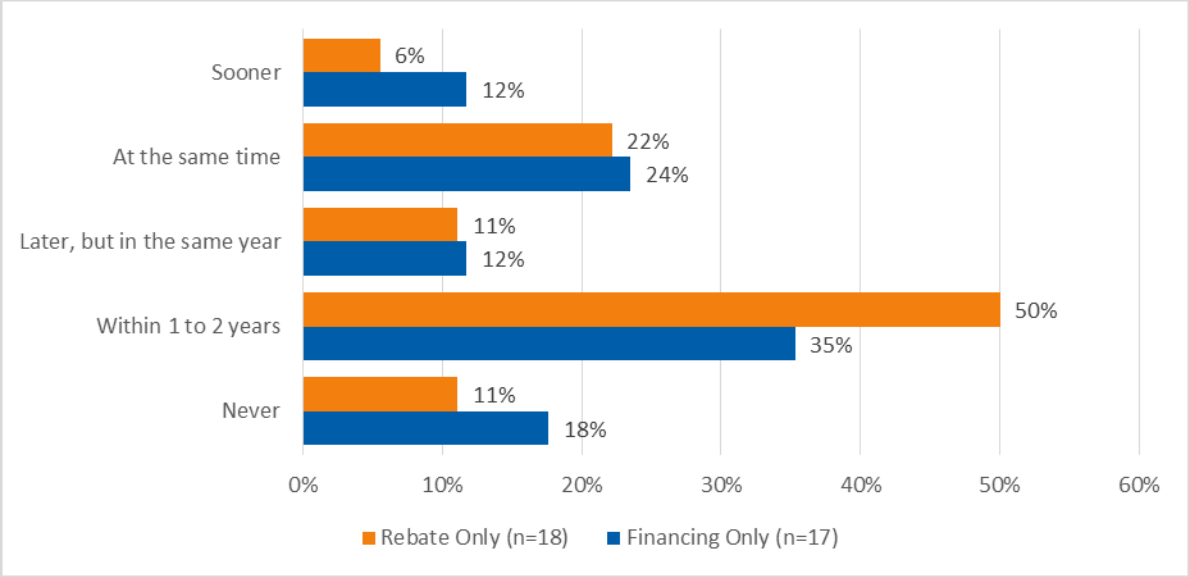
Table 3 shows that participants were more likely to have moved forward at some point with a project in the absence of financing (80% indicated some likelihood) than in the absence of the rebate (68% indicated some likelihood).

Table 3. Participants' Likelihood of Proceeding—Financing Vs. Rebates

	Proceed with Financing, without Rebates	Proceed with Rebates, without Financing
No Likelihood	8 (32%)	5 (20%)
Low Likelihood	13 (52%)	10 (40%)
Moderate Likelihood	1 (4%)	5 (20%)
High Likelihood	3 (12%)	5 (20%)

However, participants indicated they were slightly more likely to complete a project sooner as a result of financing (Figure 4).

Figure 4. Impact of Financing versus Rebates on Project Timelines



Overall, rebates appeared to be slightly more important to a participant's decision to move forward; however, because financing has been used as an additional offering to "close the deal" if customers are not moving forward with rebates only, participants may place more weight on the incentives—in reflection—through their survey responses.

Virtually all OBR participants (96%) were very satisfied with their program experience, compared to 74% of rebate-only participants (another 20% of rebate-only participants were somewhat satisfied with their experience).

Attribution

Cadmus also conducted a quantitative analysis of the relative influence of rebates and financing on net program participation (i.e., the percentage of OBR participation attributable to the program). Looking at each intervention (rebates and financing) individually, net participation for the rebate is 85% and net participation for financing is 78% for an attribution ratio of 1.09, meaning rebates are 1.09 times more effective than financing at achieving program participation. However, this analysis also suggests that, without financing, 78% of customers would not have proceeded with the same improvement under a similar timeframe.

Market Assessment

The 130 unique accounts that have participated in OBR represent about 2.5% of the total LCI customer base of 5,194 accounts (customers with average peak demand of 200 kW or more). Table 4 shows customer sectors as a percentage of the portion of the LCI customer base with an identified sector, compared to OBR participant sectors. Government is the largest customer sector, and is also the sector that participates most frequently in OBR, in terms of number of accounts receiving financing for at least one project. Other active sectors in OBR are educations (schools), manufacturing, and food service. In all sectors, there is significant opportunity for additional OBR participation if funding allowed.

Table 4. Market Penetration

Industry*	LCI Customer Base		OBR Participating Accounts	
	Number	Percentage	Number	Percentage
Government	722	22%	32	25%
Small Office	527	16%	10	8%
Retail/Wholesale	445	14%	3	2%
Education	426	13%	39	30%
Food Service (Restaurants)	363	11%	13	10%
Manufacturing	167	5%	15	12%
Health Care	164	5%	8	6%
Finance, Insurance, Real Estate	85	3%	1	1%
Agriculture/Mining	55	2%	1	1%
Hotel/Motels	41	1%	4	3%
Nonprofit/churches	17	1%	0	0%
Transportation	6	0%	0	0%
Construction	0	0%	0	0%
Other	198	6%	4	3%
Total, excluding "unknown"**	**3,216**	**100%**	**130**	**100%**

*Categorization does not conform to National Grid C&I Database categorization, as Cadmus used available NAICS codes to reassign several accounts labeled "small business" as government, nonprofit/churches, finance, real estate, or other category. One participants classified themselves as transportation in the survey, for the purpose of this table all municipal or government transportation organizations were reported under the Government business sector.

**Total does not include over 1,978 customers with business sector "unknown". Percentage totals may not equal 100% due to rounding.

Source: National Grid C&I Customer Database dated 2/6/2015. 2014-2016 RI LCI OBR Projects Participants dated 6/7/2016

Participant and nonparticipant surveys indicate customers make numerous energy efficiency upgrades outside National Grid programs (64% of participants and 69% of nonparticipants, excluding rebate-only respondents), and a substantial minority pay for these using some kind of financing (12% of participants and 20% of nonparticipants). Surveys also provided some evidence that some customers do not have access to financing.

Nonparticipants were slightly less aware of their energy usage than participants were; 77% of nonparticipants could estimate energy usage as a percentage of monthly expenses, compared to 92% of participants. Nonparticipants were also less likely to indicate energy savings was a motivation for implementing a project that resulted in greater energy efficiency (58% of nonparticipants cited energy savings compared to 84% of nonparticipants).

Conclusions and Recommendations

Cadmus' conclusions related to the overarching research questions addressed in this study are presented below.

Is OBR performing optimally, and does the program's design conform to industry best practices?

Conclusion: The OBR program design is appropriate to program goals, conforms to industry standards, and results in satisfied customers. Participation in the OBR program is increasing as fast as program staff will allow, and 94% of participants were somewhat or very satisfied with their experience. Benchmarking the OBR program design and performance revealed that the OBR program has similar design elements to other programs targeted to large commercial customers, and that OBR participation is comparable to participation in other programs. The increase to the five-year maximum tenor brought the OBR program in line with other programs, which all have the same or longer maximum tenor.

Conclusion: The OBR program requires substantial future allocations to the fund to fulfill its potential for increased participation. Cadmus found that there is significant opportunity to grow the fund to meet demand. At the current rate of growth (60% increase per year), even the upper end of potential allocations, $28 million over three years, is insufficient to maintain the fund for more than five years. However, at 10% annual growth, the fund balance declined slowly enough that the fund remained solvent over almost the entire 10-year period with a single allocation of $1.5 million. Because of default, the fund balance will always be slowly declining, and will always need periodic allocations of funding to remain solvent, unless the program charges interest.

> **Recommendation:** Consider setting formal targets for savings and participation in the fund, and establish a funding schedule that will support the projected participation and protect against defaults. Stable funding will give program managers the ability to better leverage the dollars available in the fund and be accountable for meeting expected performance. Setting either a funding target or a savings and participation target will be sufficient to allow National Grid staff to utilize all funds, but manage whatever constraint they face.

Conclusion: National Grid may be able to charge interest legally on OBR financing, but the benefits are not worth the negative impacts. An interview with National Grid legal counsel and information provided by a Rhode Island Department of Business Regulations (DBR) representative did not indicate any reason why National Grid would *not* legally be allowed to charge a low-interest rate for OBR loans, though the company may be required to obtain a mortgage license for certain customers or projects. However, previous research related to charging interest was tangential, determining only that it was not in National Grid's best interest at the time and not drawing a formal conclusion as to whether it was possible.

There are benefits to National Grid from charging interest, but Cadmus does not consider these sufficient to outweigh the drawbacks. An interest rate at or just above the default rate would allow the fund to eventually reach a stable state, where repayment provides sufficient funds for financing new

projects and no allocations are necessary to cover defaults. However, charging interest, even if the rate of increase in participation dropped from 60% to 10% annually, would not grow the fund quickly enough to meet demand in the near term. And while charging interest would make the OBR program less costly to National Grid, it would result in reduced participation (relative to not charging interest). Survey results indicated a 2% interest rate would decrease the current participation level by about 40% and, at 6% interest, customers will look elsewhere for financing. Further, based on our participant survey attribution responses, those indicating they would still participate at 2% higher interest rates also have a lower net participation rate (i.e., are more likely to be freeriders) than those indicating they would not participate at 2% interest rates.

> **Recommendation:** Cadmus does not recommend the utility pursue an interest charge at this time, though the utility may want to revisit this issue in the future when the fund reaches a more stable level of participation. Before pursuing an interest charge, National Grid should commission legal research to definitively identify the legal requirements for the utility to charge interest and assess the time and resources required and potential risk. However, in the near term and regardless of whether National Grid elects to pursue charging interest or not, National Grid staff should internally review the opportunity cost to provide funding to the OBR program at 0%, and monitor that cost on an annual basis.

Conclusion: The OBR Program may benefit from more clearly defined objectives and annual performance targets. Program staff mentioned that one goal of OBR is to offset incentive payments, making National Grid's LCI energy efficiency programs more cost-effective. However, OBR financing continues to be used primarily as a sales tool after the sales team has proposed a project, which limits its ability to replace incentives (and may have contributed to the survey findings that rebates account for 52% of net participation relative to 48% for the financing component). In addition, there are no quantitative targets for participation or overall savings for the OBR fund, and program managers expressed uncertainty over future allocations to the fund. As a result, staff tend to release only about half the available funding in any given year. Finally, while providing financing instead of rebates could potentially be more cost-effective, there is still a cost to the utility. Program managers were aware of the administration budget and the amount of money requested to be allocated to the fund. However, program staff could not estimate other costs, such as the opportunity cost of providing capital at 0%, the exact cost of defaults, and the cost of negotiating arrearage plans (and thereby extending the cost of capital). This makes it difficult to evaluate the true relative cost of offering incentives and financing offers to LCI customers.

> **Recommendation:** Program managers and other National Grid stakeholders should evaluate whether financing's purpose is to encourage more cost-effective energy savings, drive deeper savings per project, drive increased participation, or some other goal or combination of goals. Currently, the combination of rebates and financing is driving more participation than rebates alone, with rebates responsible for about 52% of participation, and financing driving the remainder. However, clearly defining the program objective will provide National Grid staff with

direction for evaluating program costs, planning and budgeting for future program years, and adjusting program design to optimize OBR program performance.

Assuming that National Grid determines that the goal of OBR is to offset some of the rebate cost, staff should pursue the following actions:

- Find ways to introduce OBR earlier in the sales conversation with customers, and look for opportunities to use OBR as a conversation starter. For example, it may be worth contacting high-usage customers in the government, education or manufacturing sectors to let them know that OBR financing is available and has unique benefits not available elsewhere – such as 0% interest, and no impact on available credit. This will allow OBR to drive energy efficiency in its own right and may attract a different type of customer, or allow customers to think about their projects in a different way.
- As noted above, staff should propose quantitative targets for the program annual performance. This will allow managers to optimize the available funds.
- Staff should investigate the actual cost to the utility of offering financing at 0%, as well as the added costs from extending financing through arrearage agreements, and the cost of nonpayments (default). While these costs may be minor and may not need to be tracked on an annual basis, staff should establish a baseline and periodically review costs to ensure the utility is able to correctly evaluate the relative cost of OBR compared to rebates.

What impact does LCI OBR have on customer decision-making?

Conclusion: Based on survey responses, 78% of participants would not have proceeded with the same project at the same time had they not had access to the financing in addition to the rebates. The attribution analysis showed the net participation rate for financing to be 78%, indicating that while customers seem to place more emphasis on rebates, financing was still an important factor for driving participation and savings. Further, half the participants that considered proceeding with their project without financing did indicate they would have installed fewer measures. And finally, slightly fewer participants (61% compare to 53%) would have installed their project within the same year with only rebates as opposed to only financing. As a result, Cadmus concludes that financing in addition to rebates not only motivated customers to move forward at all, it allowed customers to increase their scope and accelerate the timing of their projects.

Recommendation: Eliminating either rebates or financing will likely reduce program participation; however, the absolute value of the incentive may not be as important as its general availability. National Grid may be able to experiment with reducing rebate levels when offering financing, but National Grid staff should monitor participation rates to assess changes in overall participation and project scope.

What is the demand for financing, and what are the financing needs and preferences among LCI customers in Rhode Island?

Conclusion: There is significant opportunity for energy efficiency upgrades among LCI customers, as well as significant demand for financing.

Opportunities exist across multiple business sectors for National Grid to engage customers in the LCI OBR program. Participation in OBR represents only a tiny fraction of LCI customers across all sectors. In addition, 64% percent of participants and 69% of nonparticipants (not including rebate-only respondents) have made energy efficiency improvements in the past 3 years, indicating high level of interest and activity related to energy efficiency. Many nonparticipant respondents believe further opportunities exist to make improvements in their facilities to reduce their energy costs.

> **Recommendation**: If funding is available, consider broadening promotion of OBR to a wider audience. For example, using a cohort model in which similar customers (based on business type, operational challenges, etc.) are paired or grouped together, invite a participant spokesperson and targeted nonparticipants to a lunch-and-learn to discuss the potential of OBR. National Grid staff should be present to facilitate this session, and can use the session to also identify specific barriers facing customer sub-segments (e.g., schools, government agencies). This limited approach to broader market awareness will allow program staff to observe less artificial market response, and better evaluate the potential of OBR to offset incentive levels. Program staff will also learn about messaging to use to promote OBR, in ways that might drive larger project size or greater participation. For example, some respondents indicated they could not take on more debt. These respondents may not realize OBR financing is off-balance sheet and will not impact their ability to borrow for other purposes, or that the 5 year tenor can make projects more manageable on a monthly basis than they anticipate.

Conclusion: Customers who own their own buildings and are aware of their energy costs may be more likely to participate in the OBR program. The majority of participants own their buildings and understand their electricity costs as a percentage of monthly expenses. While these participants fall across a variety of business sectors, more than one-half are in manufacturing or government and municipalities. Similarly, nonparticipants who own their buildings and exhibit opportunity for OBR are also in manufacturing and government, followed by education and finance/insurance/real estate.

> **Recommendation:** Formalize the desirable characteristics of ideal participants and provide these to sales executives and other stakeholders who play key roles in identifying and offering OBR to customers. C&I Sales team staff should ensure that customers in target OBR sectors who own their facilities are aware of their monthly energy costs, to allow them to gauge the importance of these costs relative to other expenses, as this might drive interest in energy efficiency and OBR.

Introduction

Since 2011, National Grid has used funding from its Large Commercial Revolving Loan Fund to provide on-bill repayment financing (OBR) for its large commercial and industrial (LCI) customers' energy efficiency projects.[1] National Grid's OBR program offers generous financing terms - 0% interest with tenors up to 5 years. The financing is repaid through the utility bill, and as such is typically not counted as debt in a participant's asset statement, and does not impede a company's ability to borrow to fund other projects. National Grid pairs the financing with cash incentives, as well as technical assistance to identify projects, understand the potential savings and payback, and identify installers. Due to limited funding, OBR is not available to all LCI customers. Instead, National Grid staff selectively promote the financing to customers who have expressed interest in a project, but indicated they cannot afford it at the present time.

Though still small relative to the cash incentive programs, OBR has grown in funding and participation over recent years. Based on findings from a recent analysis[2] using 2014 data, National Grid extended the maximum tenor allowed through the program from 24 months to 60 months in 2015. Now that there has been a full year of OBF offered under the expanded tenor, National Grid commissioned this study to evaluate the impact of that change on demand and fund sustainability, as well as evaluate the overall effectiveness and customer impact of the LCI OBR program.

Cadmus used interviews with program stakeholders, surveys of OBR participants and non-OBR National Grid customers, and other resources to evaluate the program design, performance, and sustainability; the overall market for the program; and the program's penetration of that market to date.

Although it is essentially a component of the broader program, for the purposes of this report, we refer to financing offer as the Large Commercial and Industrial (LCI) On-bill Repayment Program (OBR) Program.

Background on LCI OBR

Since 2011, National Grid has used funding from its Large Commercial Revolving Loan Fund to provide OBR financing for LCI customers' energy efficiency projects.[3] National Grid designed the financing to be attractive (0% interest with the convenience of on-bill repayment) and combined it with technical assistance and cash incentives.

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1 National Grid. 2012 Energy Efficiency Year-End Report. May 31, 2013. Accessed online April 1, 2016: http://www.ripuc.org/eventsactions/docket/4295-NGrid-2012YrEnd-Rept%285-30-13%29.pdf

2 Dunsky Energy Consulting. Review of Energy Efficiency Financing in Rhode Island. February 19, 2015: http://www.rieermc.ri.gov/documents/finance%20study/Dunsky%20Final%20Memo%202015-02-20.pdf

3 National Grid. *2012 Energy Efficiency Year-End Report*. May 31, 2013. Accessed online April 1, 2016: http://www.ripuc.org/eventsactions/docket/4295-NGrid-2012YrEnd-Rept%285-30-13%29.pdf

Originally, the program capped loan tenors at 24 months, but, in 2015, National Grid extended the maximum tenor to 60 months to accommodate projects with potentially deeper savings but slightly longer paybacks. Due to limited available funding, National Grid staff promote the program only to select customers who indicate interest in a project, but are unable to afford the upfront payment to move forward with the project.

Program staff request allocations to the fund as part of an annual energy efficiency program budgeting process. Over the past three years, annual allocations to the fund have averaged about $3 million, but have been increasing. Program staff have allowed the annual loan volume to increase, on pace with increases occurring in the fund balance. The number of participants also has increased year over year, averaging—for the past two years—about 60% increase per year.

Research Objectives

Cadmus designed the research activities of this study to address the questions shown in Table 5.

Table 5. Research Questions

Is OBR performing optimally, and does the program's design conform to industry best practices?
What are the characteristics of typical projects and participants? (Average loan size and tenor, default rate, common measures, seasonality of funding flow, and other key characteristics.)
How long can the fund sustain activity under the current loan design, given the current demand level?
How will an interest rate change affect demand?
Can National Grid legally charge interest?
How does program design and performance compare to other similar programs?
How effectively does the LCI OBR program operate?
What parties are involved in the LCI OBR program, and what effect do they have on the flow of funds through the program?
What are OBR's customer and project eligibility criteria, and are these appropriate to the program's goals?
Do program process operate smoothly, and avoid presenting barriers to customers?
How satisfied are participants with their program experience?
What impact does LCI OBR have on customer decision making?
How does LCI OBR affect a customer's decision to implement energy efficiency upgrades relative to a rebate incentive?
What is the demand for financing, and what are the financing needs and preferences among LCI customers in Rhode Island?
What types and sizes of businesses are most likely to participate in OBR?
What is the total market size for OBR, and what is the penetration to date?
Are customers aware of their energy usage, energy costs, and energy efficiency options (including National Grid programs)?
How often do customers make facility improvements, and how do they typically pay for those improvements?
What alternative funding options do participants have, other than OBR?
What are LCI customers' attitudes toward energy efficiency, utility programs, and financing?

Methodology

For this study, Cadmus conducted several primary and secondary research activities. Each research task is described in detail below.

Program Review and Benchmarking

Cadmus interviewed program stakeholders (described in Interviews section below) to document the program's design and process. From the interview results, Cadmus identified key program design characteristics, including amount of funding available, the financing terms, the underwriting criteria and project eligibility criteria. Cadmus used the OBR program records over the period January 2014 through March 2016, as well as information from the National Grid customer database to assess key performance metrics, including the average loan size, the average tenor, the monthly loan volume, typical projects, and typical customers.

Using both publically available and unpublished evaluation data, Cadmus benchmarked these program characteristics against four commercial energy financing programs around the county:

- Michigan Saves Business Energy Saves Program
- A northeast utility's large commercial financing program[4]
- California IOU Commercial On-Bill Financing Program
- Illinois IOU Commercial On-Bill Financing Program

Fund Sustainability Analysis

Cadmus used an Excel-based cash flow model to analyze the revolving loan fund's sustainability over a 10-year time frame, from 2017 through 2026. Cadmus constructed a base model that projected future loan activity using average loan size, participation, and average tenor from past participation, as shown in Table 6. Cadmus assumed a consistent default rate of 1.5% for future loans, based on program default estimates by National Grid staff. The model assumes outstanding balances continue to be repaid on schedule.

Table 6. Base Assumptions Applied to Sustainability Analysis

Average Loan Amount	**$44,671**
Average Loan Payment (assumes 1.5% default)	**$1,121**
Average Term	**39**
Average Loans per Month	**9.6**
Average Monthly Loan Volume	**$428,320**
Average Monthly Repayment to Fund	**$10,750**
Current Fund (including outstanding balance)	**$20,130,740**

[4] This utility's identity is being concealed as this is not publically available data.

Cadmus modified the base assumptions to test the fund's sustainability under different scenarios for future allocations of funding, rates of participation, and levels of interest. The scenarios consider possible future allocations of $1.5 million in 2017 (considered likely), and $28 million over three years (2017 – 2019), representing the upper end of possible allocation amounts. These values represent the range of likely funding scenarios, according to program staff. Scenarios also consider allocations of $0, as a baseline for the other scenarios. Cadmus used results from the participant surveys to assess the impact on current participation: if the interest rate were increased to 2%, surveys show 40% of participants indicated they would have been unlikely to participate; if the interest rate were increased to 6%, 92% of participants indicated they would be unlikely to participate.

While other research conducted in this study does indicate potential for growth (see the Market Assessment section under Findings), the cash flow analysis is intended to illustrate the range reasonable funding that may be needed to meet the range of possibility for growth, and is not intended as a projection of future participation or funding needed. The program is currently growing at a rate of 60%, and we would expect the growth rate to decrease over time as the program approaches market saturation. To make the analysis as straightforward as possible, Cadmus assessed the impact on the fund of 60%, 30%, 10% and 0% annual growth rates.

Interviews

Cadmus conducted interviews with the following key program stakeholders:

- Two members of OBR Program Management staff (in one interview)
- Two vendors (Project Expeditors)
- Two members of the C&I sales team (in individual interviews)
- One representative of National Grid's legal team
- One representative of the Rhode Island Department of Business Regulations (DBR)

Cadmus conducted all interviews over the phone, except for the DBR representative, who could only be contacted through e-mail.

Cadmus used the interview findings to achieve the following: document the detailed flow of program processes; gain insights into program operations; and assess regulatory concerns related to a non-zero interest rate. To structure each interview and ensure we captured all necessary data, Cadmus prepared detailed interview guides, reviewed by National Grid evaluation staff, for National Grid program and sales team staff, the project expeditors, and the legal representatives. Each guide contained notations indicating if a particular question targeted only some interviewees to obtain the most relevant information from each targeted stakeholder.

Surveys

Through this study, Cadmus conducted two surveys. The first survey targeted participants to assess the following:

- Customers' awareness of available financing programs, their financing needs, and preferences
- Customers' decision-making processes and the importance of rebates and financing to the scope and timing of the customers' projects
- Customer satisfaction with the LCI OBR Program

The second survey—a market assessment survey—targeted two groups of non-OBR customers, defined as 1) nonparticipants (those not participating in any National Grid incentive program during the past seven years), and 2) rebate only participants (those receiving a rebate for a completed project but not participating in OBR). The market assessment survey addressed barriers to energy efficiency adoption and the need for financing in making such improvements. Specifically, the survey addressed the following issues:

- Awareness of energy usage, energy costs, and energy efficiency options
- Process for assessing and implementing capital improvement projects
- Typical financing sources for capital improvements
- Financing requirements and willingness to finance improvements
- Attitudes toward utility programs

Cadmus designed the survey instruments, and submitted them to National Grid evaluation staff for review. Our partner, Thoroughbred Market Research, programmed the survey guides and conducted the survey phone calls.

Table 7 shows unique customer names, the target number of completed responses, and the final completed responses for each audience.

Table 7. Survey Targeted Quota and Completes

Audience	Population	Target Completes	Actual Completes
Participants	82	35	25
Nonparticipants	975	35	35
Rebate Only	269	35	35

Attribution

National Grid provides customers with both cash incentives and financing as tools to encourage and support energy efficiency upgrades. However, the two offers present very different costs to National Grid, and may have different effects on customer behavior. To determine the influence that each offer

has on participation in National Grid programs, Cadmus conducted a two-step attribution analysis of all projects that received both the incentive and OBR financing.

Conceptually, this is similar to a freeridership analysis, however a full net-to-gross assessment is beyond the scope of this research. Results presented here are indicative of the relative importance of financing versus rebates on program participation.

For each respondent, Cadmus first determined the degree to which that respondent required some intervention from National Grid – whether rebates or financing - to move forward with the project. We refer to this as the net participation rate. Next, we determined to what degree each offer (the rebate or the financing) was important in the respondent's decision to move forward with a project, and calculate what portion of the net participation rate is attributable to each offer.

For the first step, Cadmus used two survey questions to establish respondents' initial net participation rates.[5] Initial net participation is the percentage of participants who would not have completed a program-eligible project if the entire program did not exist. Cadmus calculated this value as the percentage of each individual project that is in some way attributable to National Grid.

Cadmus evaluated and converted each question response into one of the following freeridership scoring matrix values:

- Yes (indicative of freeridership)
- No (not indicative of freeridership)
- Partial (partially indicative of freeridership)

Table 8 shows the initial questions and raw survey responses, followed by the translated initial freeridership-scoring matrix value (in parentheses) and the scoring decrement associated with each response (in brackets). Scores are "decremented" because each respondent score starts out at (100%) freeridership, and, the freeridership score is then reduced based upon responses to the questions. Subtracting the sum of the initial two questions' responses listed in Table 8 decremented from 100% establishes each participant's initial freeridership rate.

[5] This analysis assumed the net rate equaled 100% minus the "freeridership" rate.

Table 8. Initial Freeridership Rate Questions and Scoring

B4. If neither the rebates nor the financing from National Grid had been available, do you think your organization would have installed all, some, or none of the equipment you installed?	B3. Prior to learning about the National Grid program, were the purchase and installation of the [MEASURE1] [IF NEEDED] and [MEASURE 2] measures installed in this specific project included in your organization's capital budget?
All of the equipment (Yes) [-0%]	Yes (Yes) [-0%]
Some of the equipment (Partial) [-50%]*	No (No) [-50%]*
None of the equipment (No) [-100%]	

* Taking a conservative approach, Cadmus scored respondents as 12.5% freeriders if they answered "Some of the equipment" to B4 in conjunction with "No" to B3.

For example, a respondent who answered "All of the equipment" for question B4 and "Yes" to question B3 would receive an initial freeridership rate of 50%, which, and when subtracted from 100%, equaled a 50% initial net participation rate. This 50% initial net participation rate equals the maximum percentage of net participation attributable to either the rebates or the financing.

Cadmus developed separate rebate and financing freeridership and net participation rates, which when combined with the initial net participation rate analysis, provided an estimate of percentage of program participation attributable to rebates and the percentage of program participation attributable to financing. We designed the rebate- and financing-specific freeridership questions to elicit, to the best of the respondents' abilities, the impacts of rebates and the impacts of financing on their decisions to purchase high-efficiency equipment. Basing freeridership estimates on a series of questions (rather than a single question) helped recognize and minimize potential response biases.

Cadmus did not weight all questions equally. For example, if a respondent would not have installed measures to the same efficiency levels without the rebate (even if financing remained available), that participant would automatically become a 0% freerider on the rebate. If a respondent would not have installed measures within two years without the rebate, the participant automatically became a 0% freerider on the rebate.

We assigned other freeridership analysis questions partial weights for responses that indicated a non-freerider.[6] Using this method did not allow for respondents to be estimated as a 100% freeriders, based on a single answer to a single question; customers would have to provide consistent responses across the relevant freeridership analysis questions to be considered a freerider.

Table 9 and Table 10 show the rebate and financing freeridership questions, respectively, along with the raw survey responses, followed by the translated rebate freeridership scoring matrix value (in parentheses) and the scoring decrement associated with each response (in brackets). Each respondent

[6] If the freeridership scoring decrements associated with non-automatic 0% freerider responses added to exactly 100%, Cadmus assigned a 12.5% freeridership rate to conservatively adjust for uncertainty.

started out with 100% freeridership scores and proved, through their answers, whether or not they were freeriders.

Table 9. Rebate Freeridership Rate Questions and Scoring

Question Text	Code	Response Options				
B5. What is the likelihood that you would have proceeded with any aspect of the energy-efficiency project without the rebates of [REBATE $X]. Please assume the financing from National Grid would have covered the whole project cost of [PROJECT COST $X]?	FR1	No likelihood (-50%)	Low likelihood (-25%)	Moderate likelihood (-0%)	High likelihood (-0%)	
B6. Without the rebates, but with financing for the full project cost of [PROJECT COST $X], are you likely to have completed an energy efficiency project that included all, some, or none of the equipment you installed?	FR2	All of the equipment (-0%)	Some of the Equipment (-50%)	None of the equipment (-100%)		
B7. Did the rebates of [REBATE $X] enable you to complete a larger or different project than you would have if you had received financing but no rebates?	FR3	Yes (-25%)	No (-0%)			
B8. If you had not obtained [REBATE $X] in National Grid rebates for this project but instead received financing for the full project cost of [PROJECT COST $X], would you likely have completed the project: sooner; at about the same time; later, but within the same year; within 1 to 2 years; or not at all?	FR4	Sooner (-0%)	At the same time (-0%)	Later, but in the same year (-25%)	Later within 1 to 2 years (-50%)	Never (-100%)
B9. And if you didn't receive the National Grid rebate for this project but instead received financing for the full project cost of [PROJECT COST $X], would you have installed equipment with the same level of efficiency?	FR5	Same level of energy efficiency (-0%)	Standard Efficiency (-100%)			

Table 10. Financing Freeridership Rate Questions and Scoring

Question Text	Code	Response Options				
B10. What is the likelihood that you would have proceeded with any aspect of your energy-efficiency project if the financing of [FINANCE $X] had not been available? Please assume you would still have received the same rebates of [REBATE $X]?	FR1	No likelihood (-50%)	Low likelihood (-25%)	Moderate likelihood (-0%)	High likelihood (-0%)	
B11. Without the financing but with the rebates of [REBATE $X], do you think your company would still have installed all, some, or none of the equipment you installed?	FR2	All of the equipment (-0%)	Some of the Equipment (-50%)	None of the equipment (-100%)		
B12. Did the financing enable you to complete a larger or different project than you would have if you received only the rebates of [REBATE $X] and no financing?	FR3	Yes (-25%)	No (-0%)			
B13. If you had not obtained financing from National Grid for this project but did receive the same rebates of [REBATE $X], would you have been likely to complete the project: sooner; at about the same time; later, but within the same year; within 1 to 2 years; or not at all?	FR4	Sooner (-0%)	At the same time (-0%)	Later, but in the same year (-25%)	Later within 1 to 2 years (-50%)	Never (-100%)
B14. And if you didn't receive the National Grid financing but did receive the rebates of [REBATE $X], would you have installed equipment with the same level of efficiency?	FR5	Same level of energy efficiency (-0%)	Standard Efficiency (-100%)			

Cadmus calculated rebate- and finance-specific net participation rates by subtracting the freeridership rates from 100%, as shown in the following equations:

$$Rebate\ Net\ Participation\ Rate = 100\% - Rebate\ FR\ Rate$$

$$Financing\ Net\ Participation\ Rate = 100\% - Financing\ FR\ Rate$$

Cadmus calculated the net attribution ratio for the program's rebate and financing components using the following equation:

$$Net\ Attribution\ Ratio = \frac{Average\ of\ \left(Intial\ Net\ Rate \times Rebate\ Net\ Rate\right)\ for\ all\ respondents}{Average\ of\ \left(Intial\ Net\ Rate \times Financing\ Net\ Rate\right)\ for\ all\ respondents}$$

Findings

This section presents Cadmus' key findings, drawn from analysis of data collected for this study.

Program Design

In concert with technical assistance and cash incentives, National Grid uses funding from its Large Commercial Revolving Loan Fund to offer attractive financing (i.e., 0% interest with the convenience of on-bill repayment) to customers who otherwise would be unable or unwilling to move forward with energy efficiency upgrades. The financing removes barriers for customers that could not find alternative financing, and it serves as a sales tool for customers who considered it undesirable to finance a project through more traditional loan products or by paying cash.

Program Goals

According to National Grid program staff, the financing program structure has evolved over time, as have the objectives for offering financing. The financing initially sought to support customers that wanted to participate in the rebate program, but could not afford the upfront payment required after applying the rebate. Though the program still operates in this fashion, program managers now see the financing offering as a means for National Grid to encourage energy efficiency upgrades more cost-effectively, since unlike a rebate incentive, financing is eventually repaid to the utility. Going forward, program managers expect National Grid to continue to reduce available incentives and increase available loan funds. To date, National Grid has not reduced its prescriptive incentives in relation to increases in funding allocated to OBR, but the staff have reduced the maximum custom project incentive from $0.40/kWh to $0.25/kWh. . The program does not have annual energy savings or participation targets.

Key Roles and Responsibilities

National Grid's planning staff proposes the design, budget, and goals for the utility's full portfolio of energy efficiency programs, including the LCI rebate and OBR programs, for approval by the Rhode Island Public Utility Commission. The LCI OBR program manager takes responsibility for internal coordination of implementing the OBR Program and monitors the budget.

The Commercial and Industrial (C&I) Sales Team has primary responsibility for promoting the program. The program manager and the C&I Sales Team collaborate to determine the funding available for the sales team to offer to customers over the year. Typically, this amount is around one-half of the available balance, ensuring funds remain for the coming year in the event that the program does not receive additional allocations.

The C&I Sales Team managers assign a set amount of OBR funds to each team representative that the representative can offer customers over the year. The C&I Sales Team representatives then work with individual C&I customers to identify opportunities for energy efficiency and design projects eligible for National Grid incentives and financing.

Application Process

There is no formal application process for OBR financing. Once a customer has expressed interest in a project, the Sales Team and OBR program manager review the customer's credit rating to determine if the customer is eligible. Program staff estimated that only one or two customers a year are determined ineligible. Once a customer is approved, the sales team coordinates with National Grid technicians or "project expeditors" (i.e., independent vendors that frequently install projects funded through the program) to review the facility targeted for measure installations and estimate the savings potential. Projects become eligible for OBR financing if they meet the requirements for either the prescriptive or custom rebates. The sales team reserves the necessary amount of funding for the customer. Once the project is complete, the incentive payment is processed first, followed by the OBR payment. Program staff estimated the OBR payment may be issued as much as a week after the incentive, but typically is issued only one or two days later. Because the customer plays very little role in the application process, program staff did not consider that it presented any barrier to customer participation in the OBR program.

Flow of Funds

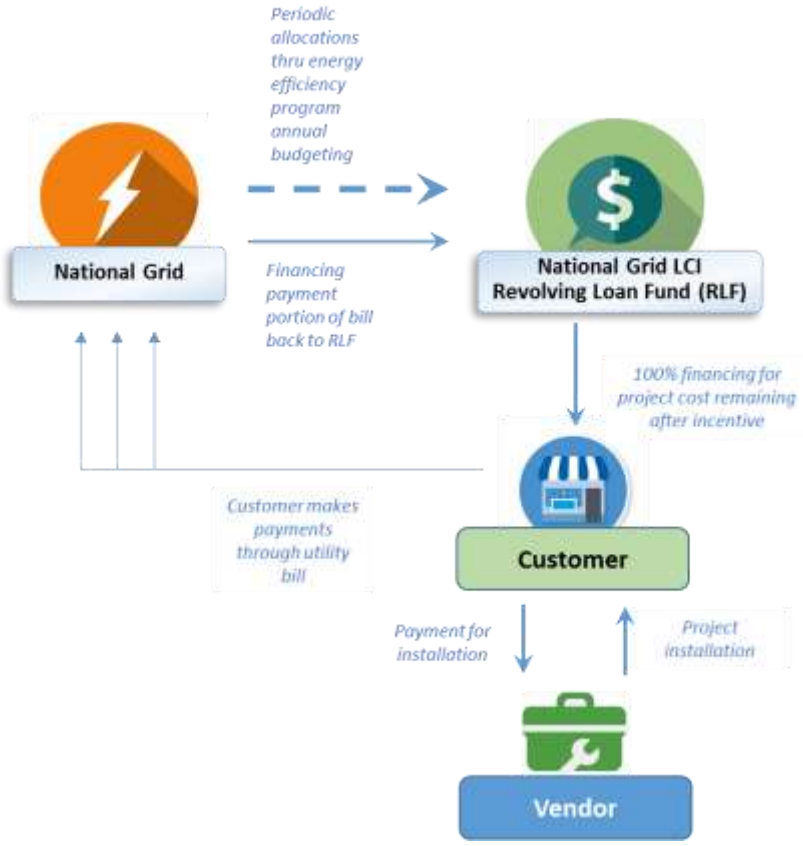
National Grid allocates the program administration budget and loan capital as part of its energy efficiency portfolio. At the beginning of each program year, newly allocated loan capital transfers to a Large Commercial Revolving Loan Fund, held by National Grid.

Upon identifying an eligible project, the Sales Team applies for and reserves funding on the customer's behalf. National Grid C&I Sales Team staff perform underwriting is based on the customer's bill pay history, as determined by the customer's internal credit grade. When the project is complete (determined by inspection by National Grid technicians), National Grid processes the loan and issues the full loan amount to the party designated by the customer. Billing commences as a line item in the customer's next utility bill.

As the customer makes payments back to the utility, National Grid deposits the OBR payment portion of each bill back into the Revolving Loan Fund. The lowest priority for funding, the loan payment is the last obligation satisfied if the customer does not pay the full amount due. For customers regularly missing payments or accruing a large amount in arrearage, National Grid negotiates payment plans, typically with very low monthly payments, before writing off the debt. Such arrangements, however, are rare. Staff estimated that less than 2% of customers with a late payment are at risk of needing a payment plan, and program tracking showed only 3.8% of OBR participants have a payment more than 60 days past due.

Figure 5 shows the LCI OBR program's funding flow.

Figure 5. Flow of Funds for the LCI OBR Program



Financing Terms and Eligibility

The program offers a generous financing product with minimal customer eligibility criteria. Discussion follows regarding specific financing terms and eligibility requirements.

Financing Terms

National Grid offers OBR financing interest free for the duration of the loan, with loan durations ranging from 24 to 60 months. The program does not set minimum or maximum loan amounts, although loan amounts for any individual project cannot exceed the difference between the project's cost and the National Grid incentive. According to program accounting records, financing amounts ranged from $261 for an individual meter account to $440,017 dollars. Any loan over $250,000 must be approved by a C&I Sales Team manager.

Customer Eligibility

The OBR program targets large commercial and industrial customers (defined as nonresidential customers with peak annual electric usage over 200 kW). National Grid, however, also allows some small commercial customers with a large number of properties (i.e., a retail chain with many locations) to participate in the program. (National Grid offers a separate on-bill financing program for small commercial customers, and formal restrictions do not exist regarding whether a particular customer participates in one program or the other.)

National Grid underwrites each loan based on the customer's bill payment history, maintaining an internal credit grading system to categorize customers according to their bill payment record. Grades range from A to E, with A generally assigned to customers with excellent payment history and E assigned to customer in arrears and with no or low likelihood of collection (i.e., customers filing for bankruptcy). Customers with A or B ratings automatically become eligible for loans. For customers with a C rating, National Grid investigates the rating's circumstances and determines customer eligibility on a case-by-case basis. Customers with D or E ratings typically do not become eligible for OBR.

Project Eligibility

Any projects eligible for a rebate incentive is eligible for OBR financing. Projects may include measures eligible for prescriptive rebates or other custom energy-saving measures identified by National Grid technicians or vendors. Most commonly, the program finances lighting upgrades. Other projects include HVAC, mechanical equipment or controls upgrades.

Performance Trends

Program Activity

From January 2014 through March 2016, the OBR Program financed 163 individual projects, worth nearly $11 million. Financing activity trended upward over this period. Table 11 shows the number of participants and quarterly loan volume increased from four projects (worth just over $90,000) in 2014's first quarter to 30 projects (worth over $1.3M) in 2016's first quarter. This upward trend, however, was not linear. Rather, there is a distinct, annual pattern of sharp increases in the fourth quarter, followed by decline in the first quarter to levels still higher than the previous first-quarter's activity. This pattern may be driven by customers pushing to complete projects before the end of the calendar year, for budgeting purposes.

Table 11. OBR Program Participation, Jan 2014–March 2016

Year	Quarter	Number of Projects Financed	Total Loan Volume
2014	Jan - Mar	6	$93,491
	Apr - Jun	9	$339,304
	Jul - Sep	12	$1,184,671
	Oct - Dec	22	$2,000,337
2015	Jan - Mar	13	$848,357
	Apr - Jun	15	$1,132,264
	Jul - Sep	18	$1,195,200
	Oct - Dec	40	$2,775,587
2016	Jan - Mar	30	$1,351,030
Total		**165**	**$10,920,241**

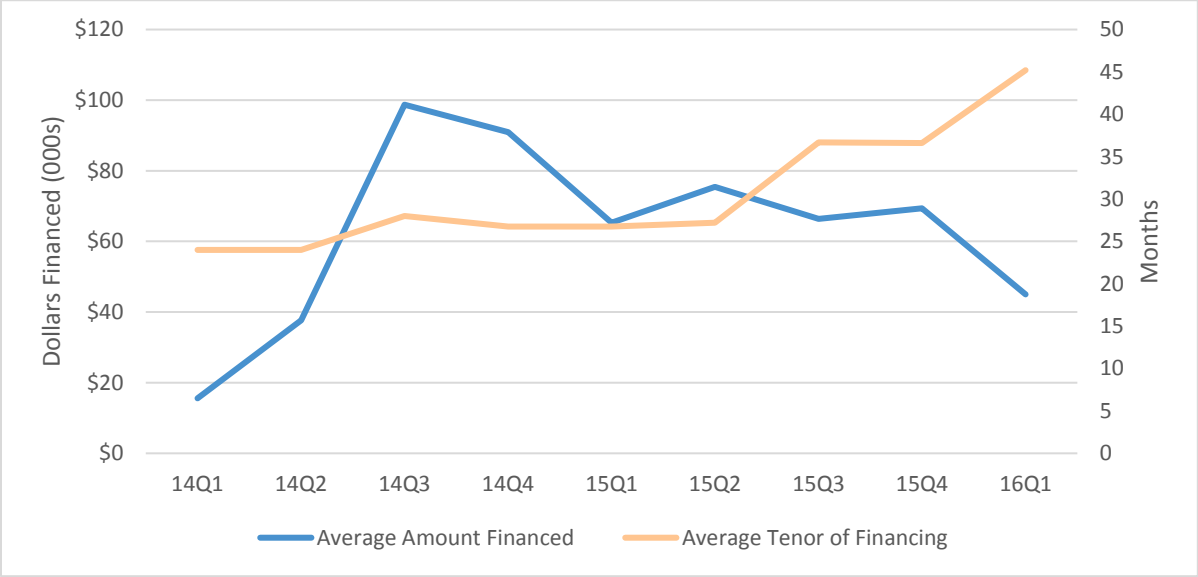
Source: OBR Participant Database, 2014 – 2016

Typical Financing

Although the overall activity level increased, the average financed amount per project remained relatively stable. This is somewhat unexpected, considering National Grid changed the maximum tenor from 24 months to 60 months in January 2015. An increase in the financing tenors can dramatically reduce monthly payment amounts, making monthly payments for larger projects easier to manage. (For example, the monthly payment for a $50,000 loan at 0% with a tenor of 24 months is $2,083. If the tenor extends to 60 months, monthly payments drop to $833.)

As shown in Figure 6, the average amount financed per project actually rose sharply just before the tenor change, achieving a peak of $98,723. From 2014's fourth quarter on, average project amounts declined steadily, ending at $45,034 in 2016's first quarter. Participants, however, took advantage of the extended tenor. The average tenor hovered around 25 months through 2015's second quarter, then rose steadily to peak at 45 months in 2016's first quarter. As a result, participants appear to be financing similar amounts of work, but making smaller monthly payments.

Figure 6. Average Financing Amount and Average Tenor, 2014–2016



Source: OBR Participant Database, 2014 – 2016

Program project data show that the projects with the longest tenors actually have the lowest average value. Table 12 shows the average financed amount per project, according to the tenor the customer selected.

Table 12. Average Financed Amount by Tenor

Tenor	Average Amount Financed	Number of Projects
24 Months	$67,581	95
36 Months	$91,749	27
48 Months	$65,272	18

60 Months	$34,537	23
Total	**$66,667**	**163***

Source: OBR Participant Database, 2014 – 2016
*The data did not include the tenor for two projects.

The performance of a financing program over time is often measured by the default rate, which is usually defined as the percentage of loans that have been written off as uncollectible. This measurement is less useful for the OBR Program for several reasons. First, the loan payments are part of the overall utility bill. If a customer goes into arrears (fails to pay their bill) and National Grid determines the debt is uncollectible, there is no way to separate nonpayment of the loan from nonpayment of the service charges. Second, the utility's protocols for dealing with a customer with a large unpaid bill includes negotiating a payment plan, typically with a very low monthly payment, before writing off the debt as uncollectible. For an OBR participant, this is essentially refinancing their initial loan with a much longer term, and results in additional cost to the utility that is not captured by the rate of default (which implies that all loans not in default are performing as intended). Therefore, rather than determine a rate of default for the OBR Program, Cadmus assessed nonpayment risk in two ways. First, Cadmus assessed the number of active loans with a payment more than 60 days past due. We also looked at the outstanding balance on accounts with a payment more than 60 days past due as a percentage of the total amount financed for active accounts (i.e., not including financing already 100% repaid). Table 13 presents the results.

Table 13. OBR Participant Nonpayment

Description of Metric	Percentage
Percentage of active loans with a payment at least 60 days past due	3.8%
Outstanding balance of active accounts with a payment more than 60 days past due, as a percentage of total loan volume	1.1%

Source: OBR Participant Database merged with National Grid accounting records, 2014 – 2016

Typical Participants and Projects

Cadmus assessed the most participant business types by number of unique accounts participating and number of projects (Some of these accounts, particularly in education, have a single point of contact, but Cadmus was not sufficiently confident in the consistency of the data to analyze this relationship). As shown in Table 14, education buildings (typically schools) make up the majority of both participating accounts and projects. Government agencies and manufacturing businesses are also frequent participants, with government projects having the largest financing amounts of these three. These three groups are also among the largest sectors in the LCI customer base, which indicates that participation is roughly proportional to size of the customer sector. (Cadmus notes that the retail and small office sectors are the exception, as these are the second and third largest customers' groups but rarely or never participate. This may be due to the fact that many of these spaces are leased.) The average financed amount by sector is not correlated with the average peak kW. Health care and

Agriculture/mining, which have the highest usage, have among the highest financing amounts, but not in correlation to the proportion of their higher usage.

Table 14. OBR Participants by Business Type

Customer Type	Number of Participating Accounts	Number of Projects	Average Peak kW	Average Financing Amount
Education	39	45	167	$41,239
Government	32	50	313	$133,777
Manufacturing	15	15	601	$76,245
Food Service	13	13	198	$22,841
Health Care	8	16	1,630	$182,431
Hotel/Motels	4	5	480	$74,396
Retail/Wholesale	3	3	208	$135,202
Agriculture/Mining	1	2	1,434	$139,052
Finance, Insurance, Real Estate	1	1	276	$3,598
Other*	14	15	550	$91,798
Grand Total	**130**	**165**	**409**	**$84,002**

*Other types of businesses include small and large commercial customers that could not be defined in the specified categories above.
Source: OBR Participant Database, 2014 – 2016

Using OBR program data, Cadmus evaluated the distribution of measure types over time. Data show that, as a percentage of total measures installed, the proportion of types of measures installed has remained relatively consistent since 2014.

Figure 7. OBR Measure Count by Measure Subprogram

Year	Lighting Measures	Custom Measures	HVAC Measures	VFD Measures	Total OBR
2014	93%	6%	1%	1%	100%
2015	90%	4%	0%	5%	100%
2016 (Q1)	95%	5%	0%	0%	100%
Total OBR	92%	5%	0%	3%	100%

Source: OBR Participant Database, 2014 – 2016

Benchmarking

Cadmus compared the National Grid OBR program's design and performance to four other similar programs operating around the country. Table 15 presents the full results of the benchmarking study.

While the five programs compared were not exactly alike, National Grid's OBR program proved similar to several in a number of key respects, with the OBR, northeast utility, and California OBF programs most similar. All three share the following characteristics:

- Funded with utility capital
- Administered directly by the utility
- Rely on bill payment histories (or simply customer relationships) for underwriting
- Determine project eligibility primarily by project payback and savings potential

All three programs offer financing to large commercial customers, although target markets vary:

- OBR targets all large commercial
- The northeast utility program is more narrowly focuses on a select subsector
- California OBF more broadly targets all commercial, large and small

The Michigan Saves program is the most unique, in that there is no direct utility involvement (although the program does coordinate with IOU programs). The Michigan and ComEd programs mostly target small commercial customers, although Michigan's program does not prohibit larger customers from participating.

Financing characteristics across the five programs varied considerably. Again, OBR, the northeast utility program, and the California OBF program offer 0% interest, while the Michigan and ComEd programs offer 5.9% or higher interest (although Michigan Saves currently offers a promotional 0% rate through cooperation with Michigan utilities).

ComEd's program appears to target smaller projects, with the goal of making monthly payments as low as possible, given the loan range of $500 to $20,000, with terms up to 10 years. The northeast utility's program is on the opposite end of that spectrum. Though the program does not define minimum and maximum loan amounts, the average project size is around $4 million. The OBR, California OBF program, and the Michigan Saves Programs serve a wider range of financing needs.

Though OBRs' minimum and maximum loan amounts are not defined, their actual minimum and maximum loans fall within the range of the other two programs, which offer loans from a $2,000 to $500,000. Since National Grid extended to the OBR term to 5 years, it conforms to the other programs. All programs except ComEd's offer a maximum tenor of five years (Michigan Saves offers seven years, in special cases), while ComEd's program offered 10 years.

Performance data were available for all programs except ComEd's. These data indicate the California and Michigan programs, which both target small commercial projects, achieved the highest annual participation and annual loan volume. Both programs exhibited similar annual performance, with the California program averaging around 100 loans, valued at $2.7 million, and the Michigan Saves program averaging 116 loans, valued at $3.5 million. Michigan Saves average loan size was just under $30,000,

while California OBF tracked an average small commercial loan of $20,000 and an average loan of $50,000 for large commercial and government projects.

As expected, considering OBR targets large commercial customers, the program achieved a lower average annual participation rate, but a higher average loan size, issuing about 38 loans a year worth about $4.8 million, with an average loan size of $66,667. All programs with available data primarily funded lighting upgrades.

Table 15. Comparison of Commercial Energy Efficiency Financing Program Design and Performance

	National Grid LCI OBF (Jan. 2014–Mar. 2016)	Northeast Utility (2010–2015)	California Commercial OBF (2006–2012, except where noted)	MI Saves Business Energy Financing (2012–2016)	ComEd Small Business OBF (2014–2015)
Program Design					
Source of Funds	National Grid ratepayer funds.	Utility ratepayer funds.	Participating utilities ratepayer funds.	Participating third-party lenders.	ComEd ratepayer funds.
Administration	Administered entirely by National Grid.	Administered entirely by utility.	Administered by IOUs and rebate program implementers.	Third-party coordinator processes applications and completes underwriting; participating lenders issue funds and service loans.	Third-party lender processes applications, underwrites applicants, and funds loans; payments collected on-bill.
Customer Eligibility	Targeted to large commercial customers (peak annual usage of 200 kW or greater), but some small commercial customers also participate.	Select subsectors with average annual demand greater than 200kW.	All C&I and government customers eligible; terms vary by customer class.	All nonresidential entities in Michigan.	Small business customers.
Underwriting Criteria	Customer must have internal credit rating of C or better.	No underwriting criteria.	All utilities require an account in good standing. One utility requires the account be at least 24 months old, and in good standing for 12 months.	Credit history of business owner. Must have credit rating of 640 or above.	Not specific but subject to credit checks. Administered by third-party lender. Loans are unsecured.
Project Eligibility	Project must be eligible for prescriptive or custom rebate incentives.	Project must be determined through investment-grade audit process, have simple paybacks of 15 years, and pass utility cost-effectiveness tests.	Projects must meet savings requirements and must be bill-neutral over the loan period. Basic lighting limited to 20% of project costs (advanced LEDs are exempt; government customers are exempt).	Michigan Saves establishes a prescriptive list; custom measures may be eligible if recommended through a comprehensive energy assessment.	Any equipment eligible for utility rebate incentives, including lighting, HVAC, building envelope, commercial kitchen, lab equipment, refrigeration, VSDs, and custom equipment.

	National Grid LCI OBF (Jan. 2014–Mar. 2016)	Northeast Utility (2010–2015)	California Commercial OBF (2006–2012, except where noted)	MI Saves Business Energy Financing (2012–2016)	ComEd Small Business OBF (2014–2015)
Loan Characteristics					
Interest Rate	0%	0%	0%. (State waiver to offering financing without a license contingent on no interest.)	5.9% to 11% standard; special 0% to 2.99% available through utility programs.	5.99% fixed rate unsecured
Maximum Tenor	5 years, as of Jan. 2015. Previously 2 years.	5 years (previously 3 years)	5 years for C&I, 10 years for government	5 years, with 7 years allowed for customers with excellent credit.	10 years
Minimum Loan Size	Not defined. Minimum loan on record is $261.	Not available	$5,000	$2,000	$500
Maximum Loan Size	Not defined. Maximum loan on record is $440,017.	Not available	$100,000 for C&I, $250,000 for government	$250,000	$20,000
Program Performance					
Total Number of Loans	163	33	603 (2006 - 2012)	524	Not available
Total Loan Volume ($)	$10.9 million	$129 million (includes funding for cash incentives and financing).	Statewide results not available. As of 2016, one utility had issued $21.4 million.	$15.8 million	Not available
Average Annual Participation	38	Approximately 15 projects	100	116	Not available
Average Annual Loan Volume ($)	$4.8 million	Approximately $43.5 million	$2.7 million	$3.5 million	Not available
Typical Measures Financed	Primarily lighting. Other measures include HVAC, VFCs, and custom projects.	Lighting and high-efficiency boilers and chillers.	Not available	Primarily LED lighting. Other measures include HVAC, insulation, and mechanical equipment.	Not available
Average Loan Size	$66,667	Approximately $4 million	Approximately $20,000 for small commercial, and $50,000 for large commercial and government	$29,893	Not available

Source: Cadmus research

Fund Sustainability

As a foundation for assessing potential changes to program design and marketing, Cadmus assessed the sustainability of the fund assuming a range of future allocation and participation scenarios, as well as the potential impact of charging interest.

Current Fund

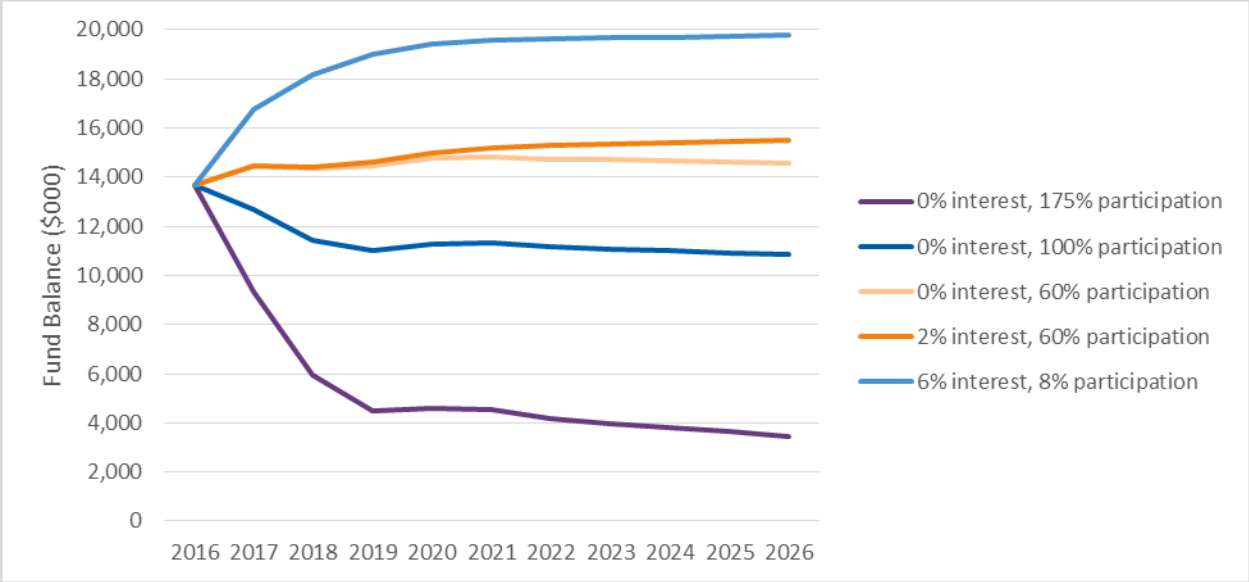
Cadmus first assessed the fund's sustainability in its current state. This analysis assumed all outstanding balances continue to be repaid, there are no additional allocations, and that demand is consistent with the average since January 2015, when the tenor was extended to 5 years. Cadmus then assessed a scenario under which the program booked $9 million in annual loan volume (175% of the 2016 loan volume), with no additional allocations to the fund, over the ten year window. This hypothetical level of participation is based on staff estimates of the upper bound of demand under the current program design.

Cadmus also analyzed the fund's current sustainability under changes to demand and repayment amounts if the program charged interest. Cadmus used the participant survey to estimate the market response to interest rates above 0%. Based on survey results, only 60% of participants would have been very likely or somewhat likely to participate at 2% interest. At 6% interest, 8% of respondents indicated they would have been very or somewhat likely to participate. Based on these data, Cadmus adjusted the model to show how charging interest could affect sustainability. Finally, to illustrate the difference in gain from interest payments relative to the decrease in participation, Cadmus also modeled the fund with 0% interest and 60% of current participation.

Figure 8 shows the fund balance for each year from 2016 through 2026, using four scenarios:

- 0% interest and annual loan volume at $9,000,000 (175% of 2016 level)
- 0% interest and annual loan volume at $5,139,837 (2016 level)
- 0% interest and annual loan volume at $3,083,902 (60% of 2016 level)
- 2% interest and annual loan volume at $3,083,902 (60% of 2016 level)
- 6% interest and annual loan volume at $411,187 (8% of 2016 level)

Figure 8. Fund Sustainability with Varying Interest Rates and Participation



Source: Cadmus analysis

The analysis shows that for all of the scenarios presented in Figure 8 the fund remains solvent over the 10-year window. In the first years, loan payments are based on past participation levels (which were less than the current average rate assumed in the model). While the issue of new project financing (outgoing funding) is consistent over the full 10-year period, the repayment rate starts low before growing to a steady state as old loans pay off and new loans begin making payments. By March 2021, all incoming payments and outgoing financing are based on a consistent participation level, with the fund balance steadily but slowly declining due to a 1.5% default rate.

Survey results shows that, if the OBR program charged 2% interest, participation would decline by about 40%. A participation decrease means less money allocated to finance new projects; as a result, the fund balance decreases more slowly.

When participation levels remain constant, charging interest significantly impacts fund sustainability. At 0% interest, with a 40% reduction in participation, the fund becomes almost perfectly sustainable over time. A 2% interest rate, using the same 60% participation level, more than offsets the 1.5% default rate, and the fund begins growing slowly over time. At 6% interest and just 8% of current participation, the fund initially grows very rapidly as outstanding loans (made when the interest rate was 0%, and participation was higher) are repaid, and then grows more slowly due to interest charges from a much smaller number of loans.

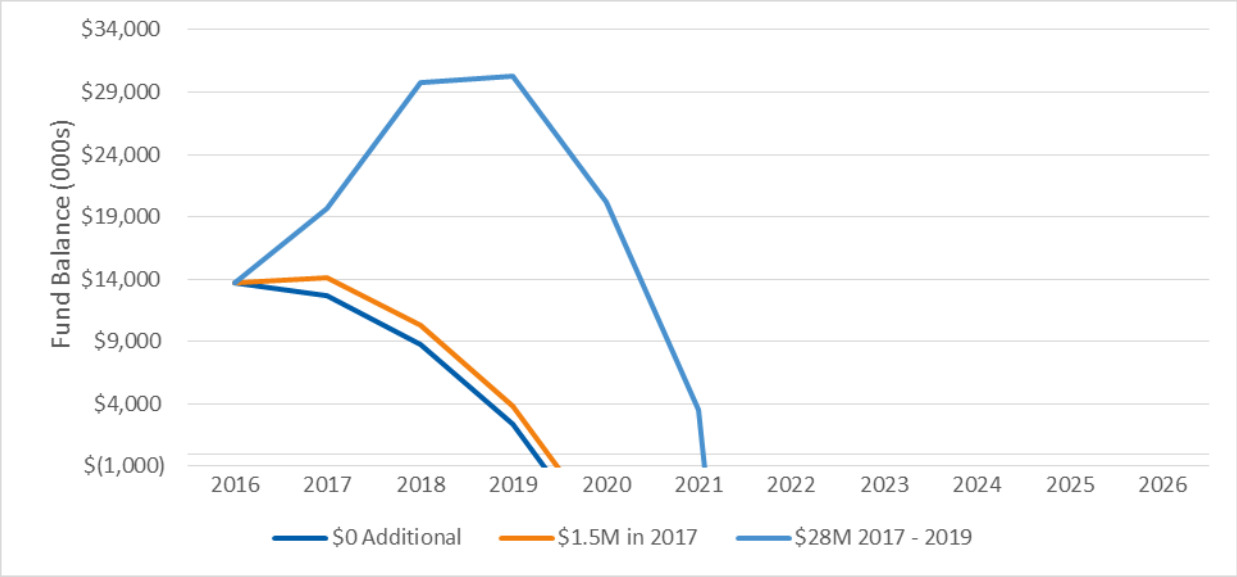
Growth in Fund Size

The above scenarios assume no further allocations to the fund, and a constant participation rate. However, the program has experienced an average of 60% increased annual participation over the past two years. In addition, OBR Program staff anticipate that National Grid will make additional fund

allocations. While funding remains uncertain, staff expect at least a $1.5 million allocation in 2017, and considered $28 million, allocated over three years from 2017 through 2019, to be the upper end of possible allocations.

Cadmus modeled the fund's sustainability at 60% growth, given the current funding level and with the following additional allocation scenarios: $1.5 million in 2017; and $28 million from 2017 through 2019 (i.e., $7 million in 2017, $14 million in 2018, and $7 million in 2019).

Figure 9. Fund Sustainability with 60% Participation Growth and Varying Funding Levels



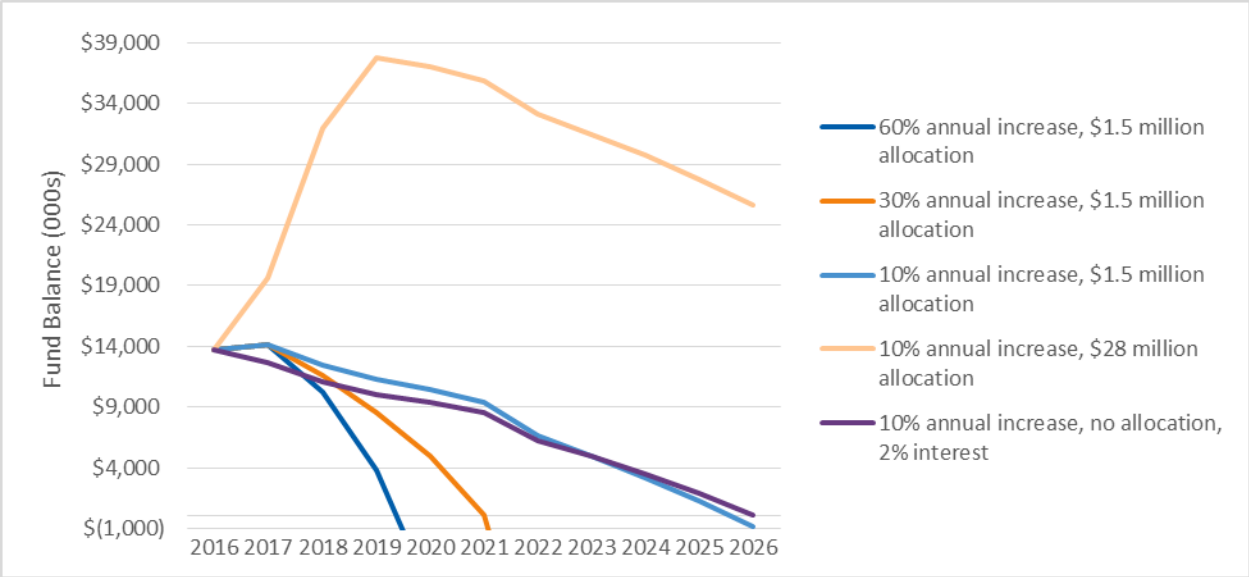
Source: Cadmus analysis

Assuming 60% participation growth year over year, the fund would require substantially greater allocations than anticipated to remain solvent. With a single allocation of $1.5 million in 2017, the fund depletes by 2019—less than a year after it would deplete without additional allocations. Even with allocations totaling $28 million (more than doubling the loan fund's current size), the fund balance reaches $0 in 2021, two years after the last allocation.

Growth in Participation

The National Grid C&I sales team promotes the OBR program carefully, providing National Grid control over each year's participation level. Although the program has grown by 60% a year for the past two years, National Grid staff could reduce future annual participation growth, if necessary. Cadmus assessed the fund's sustainability with maximum predicted allocations at 10%, 30%, and 60% annual participation increases, and a single allocation of $1.5 million in 2017. Cadmus also assessed the fund's sustainability at 10% annual participation growth with an allocation of $28 million over three years (2017 – 2019), and with no allocation but 2% interest.

Figure 10. Fund Sustainability at Different Participation Increase Rates



Source: Cadmus analysis

With a single allocation of $1.5 million in 2017, the fund is not sustainable at 60%, 30% or 10% annual growth, reaching a $0 balance in 2019, 2021, and 2026 respectively. Cadmus adjusted the 10% growth scenario in two ways. We considered the impact on the fund balance of an upper-end allocation of $28 million over three years, and the impact of no allocation, but a 2% interest charge. If the allocation is increased to $28million, the fund is easily sustainable, with a balance of about $25 million in 2026. With no allocation, but a charge of 2% interest, the fund is just barely cash-positive at the end of the 10-year window, with a balance of about $79,000. Though nearly at $0, this balance is higher than the balance with a single $1.5 million allocation but 0% interest.

Legality of Interest

National Grid does not currently charge interest for the OBR Program financing. As a result, National Grid bears the program's full cost of access to capital. Consequently, a potential opportunity exists for National Grid to reduce the OBR Program's cost by charging participants interest. Cadmus spoke with a representative from National Grid's legal counsel and communicated via e-mail with a licensing officer from the Rhode Island Department of Business Development, Division of Banking, to understand the legal implications if the utility chose to charge interest at a future date.

The National Grid legal representative provided information about research that National Grid's staff commissioned from outside counsel (related to program design for the Energy Efficiency Loan Trust [EELT], a program similar to OBR that National Grid considered launching in 2013). The research determined that financing activity expected under the EELT did not constitute lending activity regulated by the state of Rhode Island as the program would provide financing for customers' convenience and not for gain. That the program did not charge interest helped to support this argument, but was not a

requirement to show loans were not provided for gain. Because that program did not require National Grid to collect interest, the outside consultants did not conduct further research into the requirements and conditions for charging interest.

According to the DBR representative, commercial organizations do not require a license when providing financing in the state of Rhode Island that meets any of the following conditions:

- Loans to corporations, joint ventures, partnerships, limited liability companies, or other business entities
- Loans over $25,000 to individuals for business or commercial (as opposed to personal, family, or household) purposes
- Loans principally secured by accounts receivable and/or business inventories

The representative also noted that Rhode Island also has a usury law that limits interest charges to 21% or less.[7]

From January 2014 through March 2016, 52% of OBR loans were below $25,000, and issued for business purposes. The remainder of the OBR program activity meets all three of the listed conditions. National Grid may be able to charge interest for OBR financing in amounts over $25,000 without obtaining a mortgage lender license through the state. National Grid may be able to charge interest for financing in amounts less than $25,000, but may need a mortgage license from the state of Rhode Island to do so.

Attribution Analysis

All OBR participants also used a rebate incentive, meaning they received two complementary types of interventions to induce them to move forward with a project. To determine the relative influence of each intervention, Cadmus conducted an attribution analysis using the customer survey data. We calculated an initial net participation rate to assess the percentage of customers that would not have proceeded without both the rebates and financing. Then we separately assessed the relative importance of the financing and rebates, calculating a rebate net participation rate and a financing net participation rate. The ratio of the rebate over financing net participation rates is the attribution ratio, a measurement of the relative influence of the two types of incentives on program participation. (**NOTE: Cadmus did not weight these results by each project's savings. The results are therefore applicable only to the rate of participation by unique accounts, and should not be used to assess the net savings attributable to the financing portion of the OBR program.**)

Table 16 lists utilized response combinations from the initial freeridership questions (questions B4 and B3), the initial freeridership rate calculated using the prescribed scoring (previously presented in the

[7] R.I. Gen. Laws 19-14.1-10 , entitled, Special Exemptions.

Methodology section), the initial net participation rate,[8] and the respondents' frequency. The initial net participation rate is simply the inverse of the initial freeridership rate and is 93%.

Table 16. Frequency of Initial Freeridership Responses and Scoring

B4	B3	Initial FR Rate	Initial Net Participation Rate	Frequency
Partial	Yes	50%	50%	2
Partial	No	12.5%	87.5%	6
No	x	0%	100%	17
LCI Program Average		**7%**	**93%**	

The second step of the analysis looks at each respondent's rate of freeridership for each of the interventions, rebates and financing. Cadmus applied each respondent's initial net participation rate to that individual's rebate net rate and financing net rate[9], in order to determine the percent of that individual's participation attributable to the rebate, and attributable to the financing. The ratio of the rebate and financing net participation rates for an individual equals that individual's specific attribution ratio. For example, a respondent with a rebate net participation rate of 100% and a financing net participation rate of 100% would have an attribution ratio of 1.0, which indicates the rebates and financing had equal influence on the respondent's participation decisions. Table 17 presents the attribution ratio analysis components for each respondent, along with the average percent of net participation attributable to rebates and the average percent of net participation attributable to financing.

[8] For analysis purposes, the study used a net ratio of 100% minus the freeridership ratio. Note that this analysis is not intended to estimate a program net-to-gross ratio, as that would require more questions about the combined program of rebates and financing and is beyond the scope of this analysis. The initial net rate is only calculated as a starting point for determining the relative importance of rebates and financing for determination of the attribution ratio.

[9] Rebate net rate is equal to (1 – Rebate FR Rate). Finance net rate is equal to (1 – Financing FR Rate).

Table 17. Attribution Ratio Analysis Components by Respondent

			Initial Net Participation Rate × (1 –Rebate FR Rate)		*Initial Net Participation Rate × (1 – Financing FR Rate)*
	A	B	C=A x (1 – B)	D	E=A x (1 – D)
ID	Initial Net Rate	Rebate FR Rate	% of Net Participation Attributable to Rebates	Financing FR Rate	% of Net Participation Attributable to Financing
1	100%	0%	100%	0%	100%
2	100%	0%	100%	0%	100%
3	100%	0%	100%	50%	50%
4	100%	0%	100%	0%	100%
5	100%	0%	100%	0%	100%
6	100%	25%	75%	100%	0%
7	100%	12.5%	87.5%	0%	100%
8	100%	0%	100%	0%	100%
9	100%	0%	100%	0%	100%
10	100%	0%	100%	0%	100%
11	100%	0%	100%	0%	100%
12	100%	0%	100%	50%	50%
13	100%	25%	75%	0%	100%
14	100%	0%	100%	0%	100%
15	100%	0%	100%	0%	100%
16	100%	0%	100%	0%	100%
17	100%	0%	100%	0%	100%
18	87.5%	0%	87.5%	0%	87.5%
19	87.5%	0%	87.5%	12.5%	76.6%
20	87.5%	0%	87.5%	0%	87.5%
21	87.5%	75%	22%	75%	21.9%
22	87.5%	50%	44%	75%	21.9%
23	87.5%	0%	87.5%	0%	87.5%
24	50%	0%	50%	0%	50%
25	50%	50%	25%	50%	25%
LCI Program Average			**85%**	**Average**	**78%**

Cadmus calculated the net attribution ratio for the program's rebate and financing components using the following equation:

$$Net\ Attribution\ Ratio = \frac{Average\ of\ \left(Intial\ Net\ Rate \times Rebate\ Net\ Rate\right)\ for\ all\ respondents}{Average\ of\ \left(Intial\ Net\ Rate \times Financing\ Net\ Rate\right)\ for\ all\ respondents}$$

Adopting the average 85% net participation percent attributable to rebates and the average 78% percent of net participation attributable to financing (per Table 17), Cadmus calculated a net attribution ratio of 1.09 for the program, as shown in the following equation:

$$Net\ Attribution\ Ratio = \frac{85\%}{78\%} = 1.09$$

The 1.09 net attribution ratio indicates program rebates were responsible for 1.09 projects participating for every participating project induced by financing. In percentage terms, this equates to the program's rebate component being responsible for 52% of program participation and the financing component being responsible for 48% of program participation, as show in the following equations:

$$Rebate\ Participation\ Distribution\ \% = \frac{Net\ Attribution\ Ratio}{(1 + Net\ Attribution\ Ratio)} = \frac{1.09}{(1 + 1.09)} = 52\%$$

$$Financing\ Participation\ Distribution\ \% = \frac{Net\ Attribution\ Ratio}{(1 + Net\ Attribution\ Ratio)} = \frac{1.00}{(1 + 1.09)} = 48\%$$

Participant Experience

The participant survey collected data on the following:

- Customers' motivations to participate in the LCI OBR program
- The impact of financing offers (in relation to the National Grid incentives) on customers' decisions to complete projects
- Customers' overall satisfaction with their experience

Participant Motivation

As typically seen in energy efficiency programs, 21 (84%) LCI OBR program participants said saving energy and reducing their energy bills served as their primary motivations for making upgrades.

Overall, Cadmus found the rebate more influential than financing in convincing customers to move forward with projects, but financing typically allowed participants to install projects sooner than with rebates alone. Rebates and financing appeared to have roughly the same effect on the type and number of measures installed. The quote below is typical of participants' comments on the program:

> *"It's a great program. I don't really think that we would have considered the upgrades, had it not been [for] the rebates and financing together because it would have been cost prohibitive." OBR Participant*

Cadmus also found that, while most participants reported learning about financing and incentives at around the same time, a significant minority (28%) learned about rebates first. This conforms to how

National Grid promotes the program, and may contribute to some of the emphasis on rebates that we found in the survey results.

As shown in Table 18, 68% of participants would have been likely to proceed with any aspect of their projects had they only received financing, compared to 80% receiving only rebates.

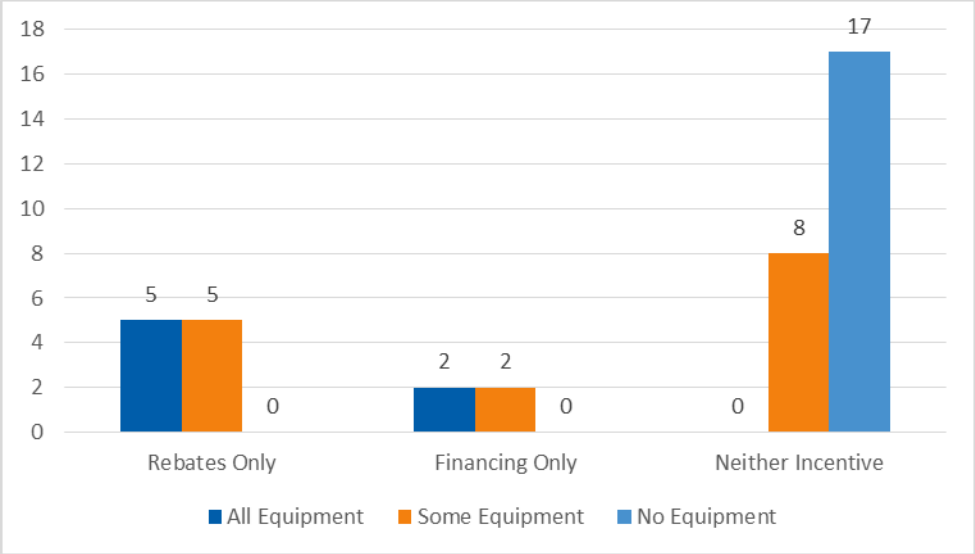
Table 18. Participants Likelihood of Proceeding—Financing vs. Rebates

	Proceed with Financing, without Rebates	Proceed with Rebates, without Financing
No Likelihood	8 (32%)	5 (20%)
Low Likelihood	13 (52%)	10 (40%)
Moderate Likelihood	1 (4%)	5 (20%)
High Likelihood	3 (12%)	5 (20%)

Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Question B5: What is the likelihood that you would have proceeded with any aspect of the energy-efficiency project without the rebates of **[REBATE $X].** Please assume the financing from National Grid would have covered the whole project cost of **[PROJECT COST $X]**? Would you say:..? (n=25). Question B10: What is the likelihood that you would have proceeded with any aspect of your energy-efficiency project if the financing of **[FINANCE $X]** had not been available? Please assume you would still have received the same rebates of **[REBATE $X]?** Would you say:…? (n=25)

To assess the impact of financing versus rebates on project scope, Cadmus asked participants that indicated they had a high or moderate likelihood of proceeding without one incentive or the other what measures they would have installed. About half of these respondents would have installed only some of the measures included in their projects (Figure 11). Probable installations with neither financing nor rebates were much lower, with 17 of 25 (68%) respondents indicating they would install none of the equipment.

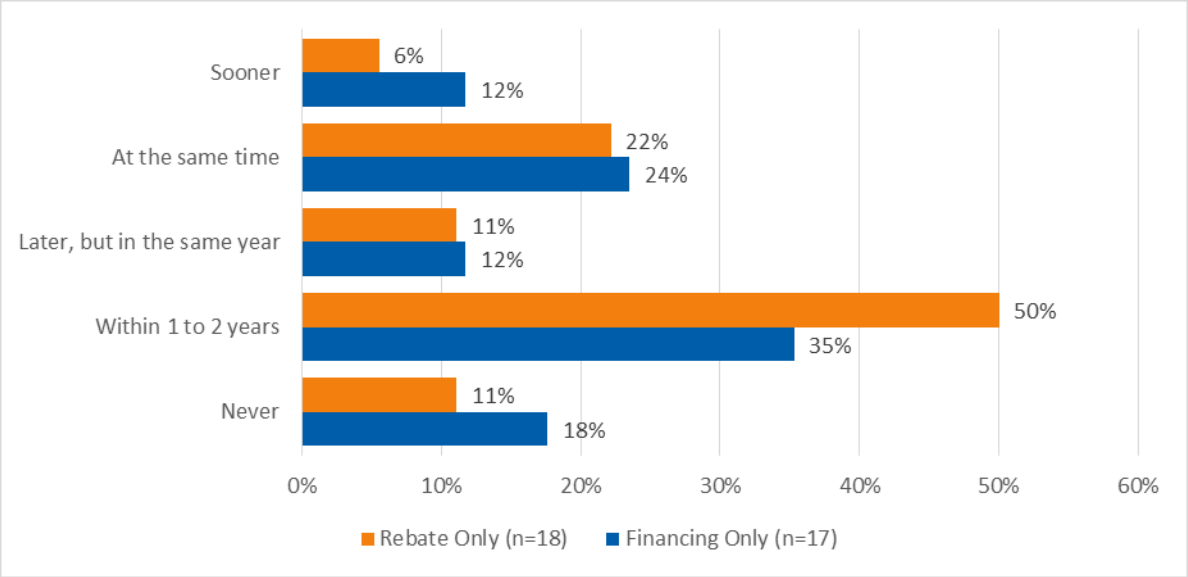
Figure 11. Project Scope for Participants Likely to Proceed



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Question B6 and B11 were graphed with results from questions B5 and B10. Question B6: Without the rebates, but with financing for the full project cost of **[PROJECT COST $X],** are you likely to have completed an energy efficiency project that included all, some, or none of the equipment you installed? (n=25). Question B11: Without the financing but with the rebates of **[REBATE $X]**, do you think your company would still have installed all, some, or none of the equipment you installed? (n=25). Question B4: If neither the rebates nor the financing from National Grid had been available, do you think your organization would have installed all, some, or none of the equipment you installed? (n=25)

While more participants proved likely to proceed with a project if receiving only rebates than if receiving only financing, they also said that, without financing, more would have delayed their projects' timing. Figure 12 shows the 61% of respondents would have delayed their project more than a year with only rebates, compared to 53% with only financing.

Figure 12. Impact of Financing vs. Rebates on Project Timelines



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Question B8: If you had not obtained **[REBATE $X]** in National Grid rebates for this project but instead received financing for the full project cost of **[PROJECT COST $X]**, would you likely have completed the project: sooner; at about the same time; later, but within the same year; within 1 to 2 years; or not at all? (n=17) B13: If you had not obtained financing from National Grid for this project but did receive the same rebates of **[REBATE $X],** would you have been likely to complete the project: sooner; at about the same time; later, but within the same year; within 1 to 2 years; or not at all? (n=18)

Cadmus asked respondents whether they heard about rebates first, financing first, or about both at the same time. While 68% of respondents heard about rebates and financing at the same time, a significant number, 28% heard about rebates first. Only one respondent (4%) heard about financing first (Table 19).

When asked how they learned about the OBR financing, 17 (68%) of respondents indicated they learned from National Grid staff, and 4 (16%) learned from the vendor (the remainder learned from another source or did not know how they learned). However, 10 respondents (47%) also indicated that they consulted with their vendor about financing options during the implementation of the project.

Table 19. Frequency of Participants First Hearing About Incentives

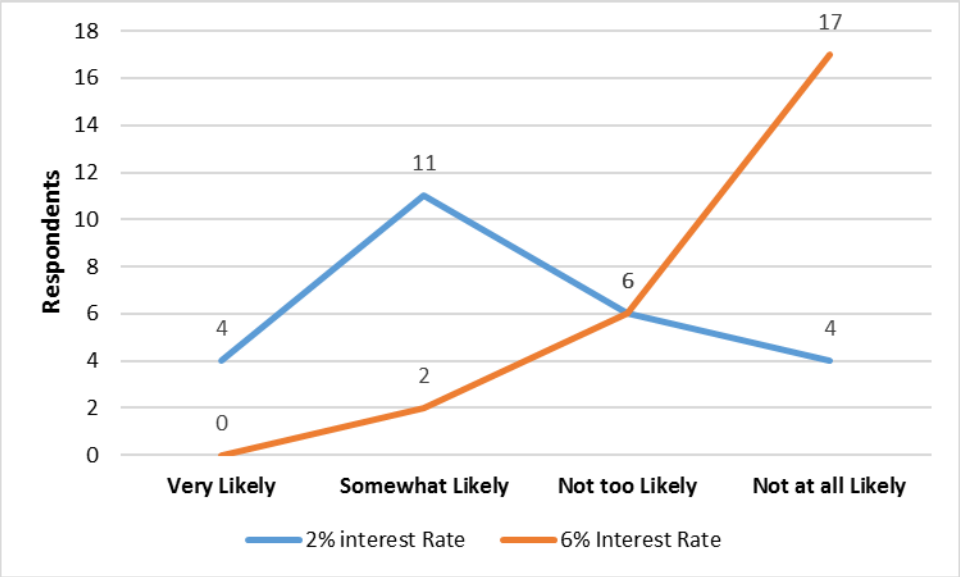
Order of Learning about Offers	% of Total Responses (n=25)
At the same time	68%
Rebates first	28%
Financing first	4%

Sensitivity to Interest Rates

Virtually all of the OBR participants – 24, or 96% - cited the 0% interest as very important (84%) or somewhat important (12%) in their decision to participate in the OBR program.

Cadmus explored participant sensitivity to interest rates and found that 21 (84%) said the zero percent financing offered by National Grid was very important to their decision to use the LCI OBR program. When asked how likely they would have been to participate in the OBR program if the interest rate was 2%, of the 25 respondents, four (16%) said very likely, 11 (44%) said somewhat likely, six (24%) said not too likely, and four (16%) said they were not at all likely to participate. When the same question was asked but with an interest rate of 6%, none said very likely, two (8%) said somewhat likely, six (24%) said not too likely, and 17 (68%) said not at all likely. Detailed responses are shown in Figure 13. Customers unlikely to participate at 2% interest rate, noted that a 2% rate might have made their projects cost prohibitive, or they would rather budget and pay cash than pay interest. When considering a 6% rate, participants said they could finance their projects elsewhere at lower rates.

Figure 13. Participant Likelihood to Participate at 2% and 6% Interest Rates



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Questions C15 and C16. How likely would you have been to participate in the On-Bill Financing program if the interest rate was 2%? Would you say…? C16 uses identical wording but with a 6% interest rate.

Further, Cadmus compared the freeridership score for the financing offer among participants very or somewhat likely to participate at 2% and those not too likely, or not at all likely to participate at 2% interest. The results show that respondents likely to participate at 2% interest have a higher financing freeridership average (20%) than those unlikely to participate at 2% interest (11%) (Table 20).

Table 20. Freeridership on Financing Offer based on Likelihood to Pay 2% Interest

Likelihood to Participate	N	Average of Financing FR Score	Likely/Unlikely Average of FR Score
Very likely	4	0%	20%
Somewhat likely	11	27%	
Not too likely	6	17%	11%
Not at all likely	4	3%	
OBR Total	**25**	**16%**	

Source: Cadmus analysis

Participant Satisfaction

LCI OBR program participants indicated high satisfaction levels, with 24 out of 25 (96%) saying they were *very satisfied*. Comments from customers, such as the one below, supported this high satisfaction level.

> "*We thought it was an unbelievable program. Financing over time to pay for the installation cost made the program possible. National Grid's generosity with this program. We've been able to install this equipment and save an average of $7,500 per month." OBR Participant*

Four OBR participants cited concerns they encountered:

- Confusion created by the number of reports and program staff changes
- Correcting an incorrect site address
- Poor quality *"weak"* ballasts and lighting equipment
- Preferring to receive the program survey online

Rebate-only participants appeared to have experiences similar to those of participants, with 26 out of 35 (74%) saying they were *very satisfied;* 7 (20%) saying they were *somewhat satisfied*, and one (3%) saying they were *not too satisfied*. Those saying they were *not too satisfied* said rebates should be higher. *Somewhat satisfied* respondents cited a need for better communication between equipment installers and National Grid, easing "cumbersome" reporting requirements, and incentive size.

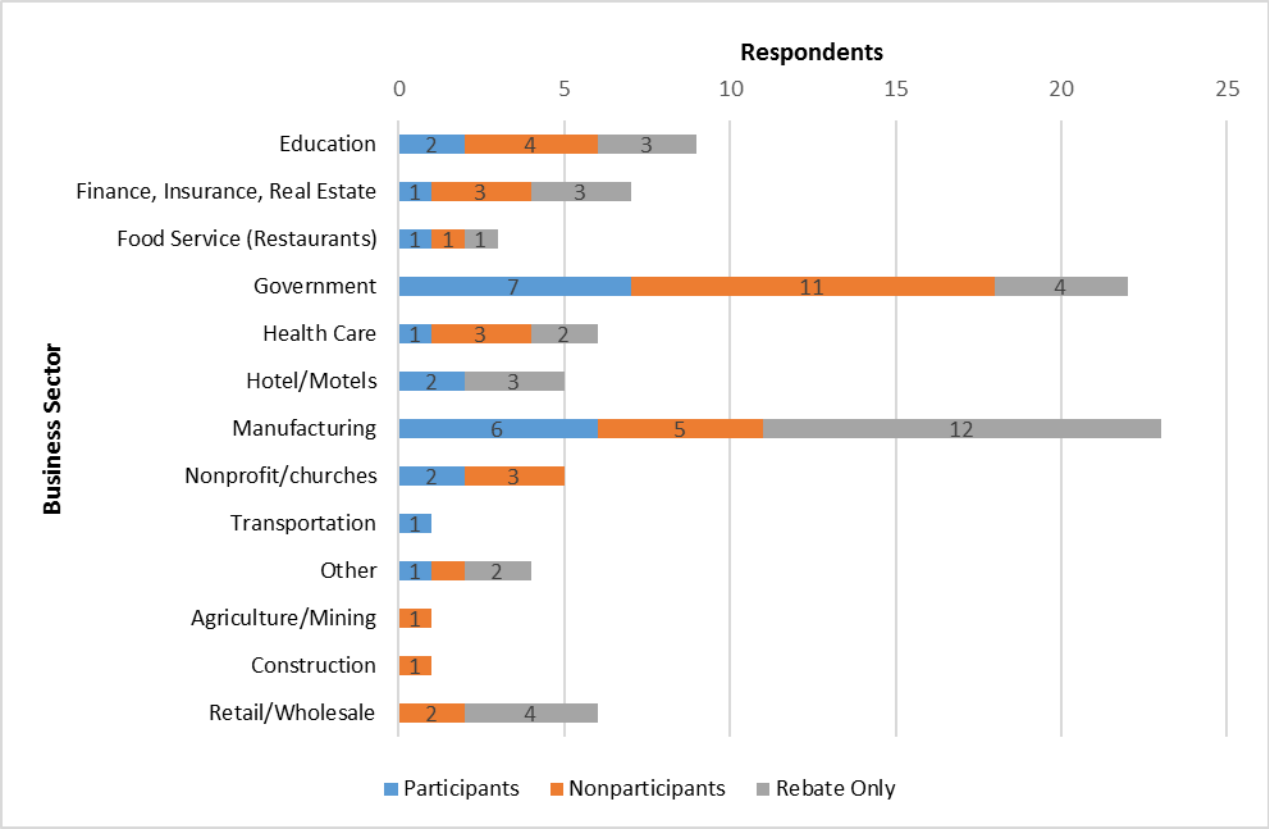
Market Assessment

Cadmus surveyed two groups of non-OBR customers to assess their preferences (and need) for OBR. The first group, nonparticipants, included those not participating in any National Grid incentive program during the past seven years (n=35). The second group, rebate only participants, received a rebate for a completed project, but did not participate in OBR (n=35). In this section, Cadmus reports non-OBR responses in comparison to participant responses if doing so enhances the context of data collected.

Survey Respondent Profiles

Both OBR participant and non-OBR respondents most frequently operated in the manufacturing and government business sectors (Figure 14). This does not conform to the pattern of participation in OBR, as shown in Table 14 (see Performance Trends), in that the majority of OBR participants are in the education sector. Predominantly, both OBR and non-OBR respondents owned their facilities. Ten (40%) of 25 OBR participant companies employed over 100 people in Rhode Island, while 33 (47%) of non-OBR companies employed over 100 people in Rhode Island, and 10 (14%) non-OBR companies employed over 1,000 people in Rhode Island.

Figure 14. Participant and Non-OBR Survey Respondents by Business Sector



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Question E3: What industry is your company in? (n=24). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, Question E1: What industry is your organization in? (n=35). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question E2: Same wording as no participation. (n=34).

Market Penetration

OBR participation includes about 2.5% of the 5,194 large commercial customer accounts that Cadmus identified in the National Grid customer database. (About 85% of the OBR participants are categorized as large commercial customers, however, the remaining 15% of participants included government

offices, grocery, warehouse, schools and other customer types that were technically categorized as small business, but are often categorized as large commercial – for that reason, Cadmus did not exclude participants not formally categorized as "large".) As shown in Table 21, significant opportunity remains in the LCI sectors that have to date been most likely to participate in OBR: education, government and manufacturing. Opportunity in the government sector is particularly important since this is both the largest sector in the LCI customer base and one of the most common participants in OBR. Small office and retail sectors have not participated proportionately to their representation among customer accounts. This may be due to the large number of these properties that are leased.

Table 21. Market Penetration

Industry*	LCI Customer Base		OBR Participating Accounts	
	Number	Percentage	Number	Percentage
Government	722	22%	32	25%
Small Office	527	16%	10	8%
Retail/Wholesale	445	14%	3	2%
Education	426	13%	39	30%
Food Service (Restaurants)	363	11%	13	10%
Manufacturing	167	5%	15	12%
Health Care	164	5%	8	6%
Finance, Insurance, Real Estate	85	3%	1	1%
Agriculture/Mining	55	2%	1	1%
Hotel/Motels	41	1%	4	3%
Nonprofit/churches	17	1%	0	0%
Transportation	6	0%	0	0%
Construction	0	0%	0	0%
Other	198	6%	4	3%
Total, excluding "unknown"**	**3,216**	**100%**	**130**	**100%**

*Categorization does not conform to National Grid C&I Database categorization, as Cadmus used available NAICS codes to reassign several accounts labeled "small business" as government, nonprofit/churches, finance, real estate, or other category. One participants classified themselves as transportation in the survey, for the purpose of this table all municipal or government transportation organizations were reported under the Government business sector.

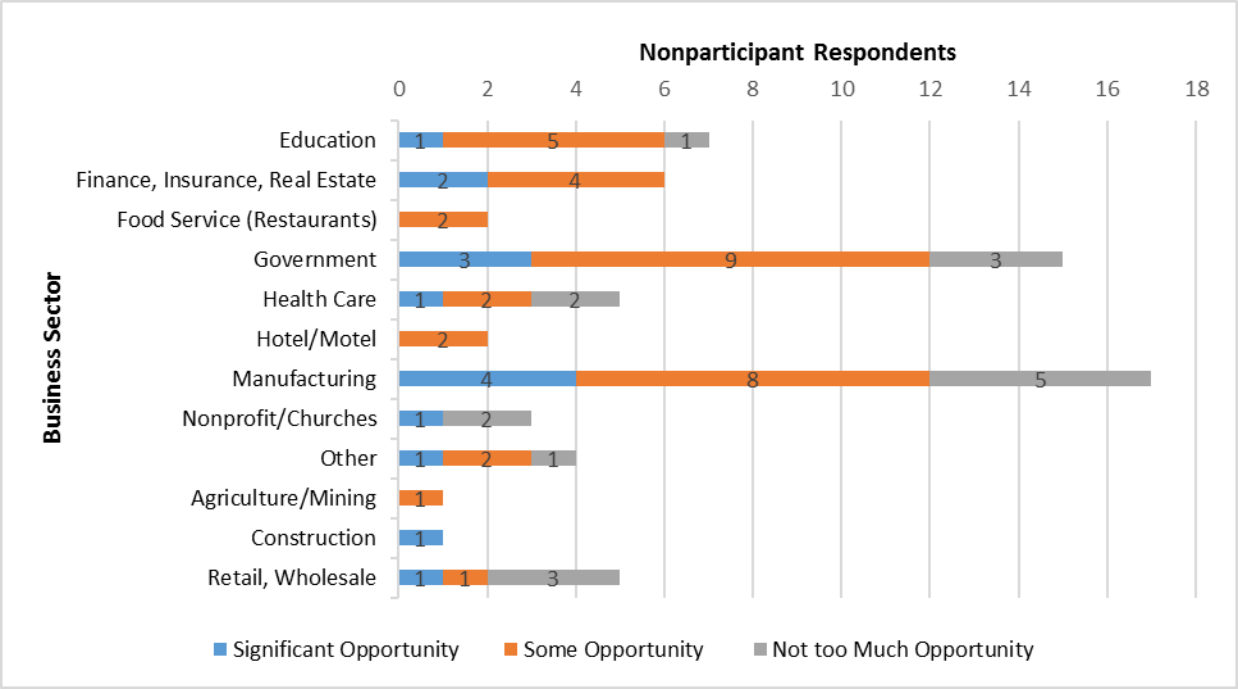
**Total does not include over 1,978 customers with business sector "unknown". Cadmus identified all OBR Participant business sectors. Percentage totals may not equal 100% due to rounding.

Source: National Grid C&I Customer Database dated 2/6/2015. 2014-2016 RI LCI OBR Projects Participants dated 6/7/2016

Non-OBR respondents offered mixed estimates of currently existing opportunities to make improvements in their facilities that would reduce their energy costs: 15 saw significant opportunities; 36 saw some opportunities; and 17 saw very few. Figure 15 shows respondents in the government and manufacturing sectors saw the largest opportunities, followed by those in education. Overlaying

participation with business sectors where respondents saw some or significant potential, the Finance/Insurance/Real Estate business sector also shows potential for OBR growth.

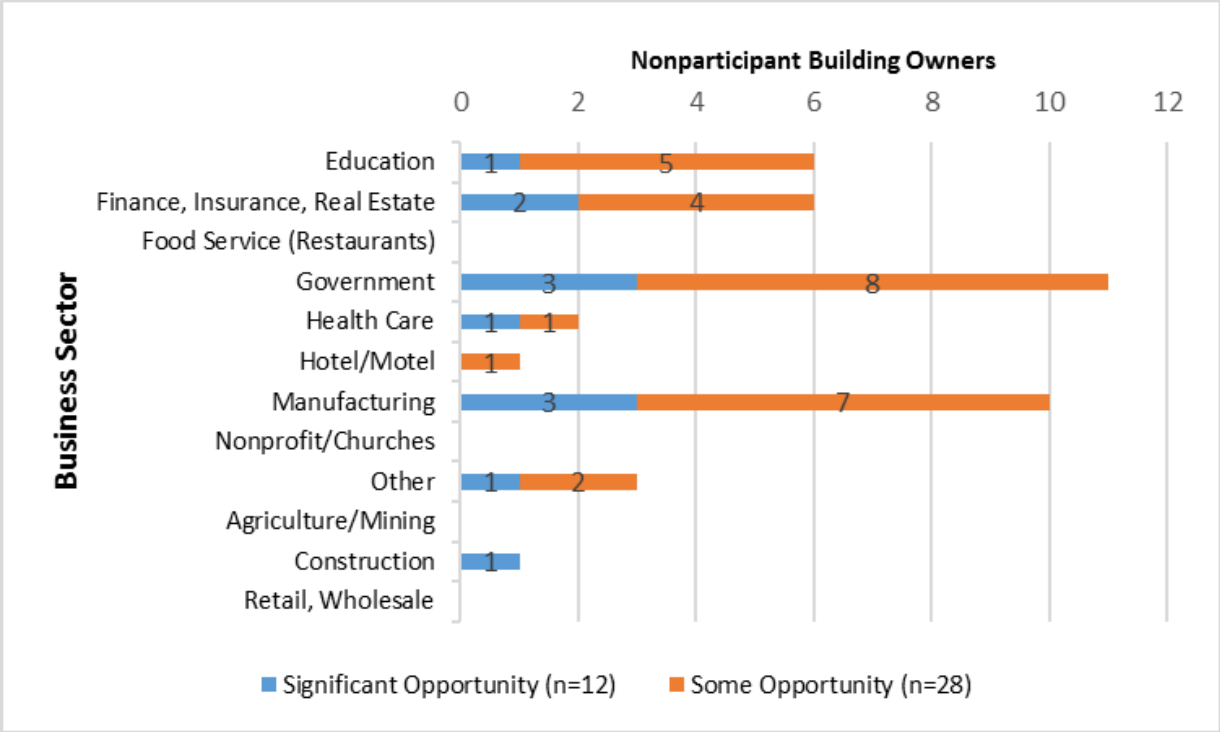
Figure 15. Non-OBR Estimates of Opportunity



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, Question E1: In your facilities in Rhode Island, how much opportunity would you estimate currently exists to make improvements that would reduce your energy costs? (n=33). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question E1: Same wording as no participation. (n=35)

Overlay one more filter - building ownership - and again the business sectors showing the most opportunity for OBR are Manufacturing and Government, followed by Education, and Finance/Insurance/Real Estate. Figure 16 provides additional detail for the distribution of non-OBR building owners who reported significant or some opportunity at their facilities. Notably, non-OBR owners in Food Service (Restaurants), Nonprofit/Churches, Agriculture/Mining and Retail/Wholesale reported little opportunity in their facilities. However, as seen in Figure 17, eight respondents who lease facilities reported some opportunity for these sectors. OBR may present a unique opportunity for these customers, as leaseholders typically have difficulty obtaining financing for improvements to property they do not own.

Figure 16. Non-OBR Estimates of Opportunity – Building Owners



Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, Questions E1: In your facilities in Rhode Island, how much opportunity would you estimate currently exists to make improvements that would reduce your energy costs? National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question E1: Same wording as no participation. (Combined n=40)

Figure 17. Non-OBR Estimates of Opportunity – Owners who Lease

Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, Questions E1: In your facilities in Rhode Island, how much opportunity would you estimate currently exists to make improvements that would reduce your energy costs? National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question E1: Same wording as no participation. (Combined n=8)

Customer Awareness

OBR participants were more aware of their electricity costs as a percentage of their monthly expenses, with 92% of participants able to estimate this value compared to 77% of nonparticipants. For both groups, as shown in Table 22, electricity costs tended to fall below 25% of monthly expenses, with the majority of participants estimating energy costs below 10% of monthly expenses. Cadmus expects some

of the non-OBR respondents that reported electricity as below 25% in fact have usage far below that amount, but could not estimate the percentage with more precision.

Table 22. Electricity Cost as a Percentage of Monthly Expenses

Electricity as a Percentage of Monthly Expenses	Participants Awareness of Energy Bills	Nonparticipants Awareness of Energy Bills
Less than 5%	2 (8%)	16 (23%)
Less than 10%	12 (48%)	10 (14%)
Less than 25%	7 (28%)	18 (26%)
Less than 50%	1 (4%)	7 (10%)
Less than 75%	1 (4%)	2 (3%)
75% or More	0 (0%)	1 (1%)
DON'T KNOW	2 (8%)	16 (23%)

Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Questions E1 Can you estimate what percentage of your monthly expenses go to your electricity bill? Would you say…? (n=25). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, and National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Questions B1, (Combined n=70). Questions E1 and B1 use identical wording.

Cadmus asked nonparticipants – those that had not used any National Grid programs and therefore not demonstrated any awareness of these programs – whether they knew of incentives and other services available from National Grid. The data revealed that nonparticipants had high awareness levels of programs and incentives available for energy efficiency upgrades. Of 35 nonparticipants not receiving a National Grid rebate, 30 (86%) said they were aware that National Grid offered rebates for energy efficiency upgrades, and 21 (60%) said they were aware of additional technical assistance and custom rebates for larger C&I projects. Cadmus asked all non-OBR customers if they could name another incentive program in Rhode Island. A minority, 30 respondents (43%), identified a program outside National Grid (compared to 16 (64%) of participants). Table 23 shows the breakdown of responses. (To avoid indirectly promoting the program, Cadmus did not ask non-OBR respondents about their awareness of the OBR program.)

Table 23. Incentive Programs Named by Non-OBR Respondents

Incentive Program	Nonparticipants
Rhode Island Public Energy Partnership	23
Energy Quality Incentives Program or Agriculture Risk Management Education Competitive Grants Program	1
Energy Resource Program	1
Green Energy	1
Rhode Island Construction Bank	1
Rhode Island Infrastructure Bank	1

Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, and National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question B5: Other than National Grid's rebate program, do you know of any other energy efficiency incentive programs available to your organization in Rhode Island? (Combined n=70)

Frequency and Funding of Facility Improvements

The majority of survey respondents in both the participant and nonparticipant groups (75% across both groups), but excluding the rebate only group, reported major upgrades to their facilities in the past three years, outside the OBR Program. Twelve (48%) participants made at least one other energy efficiency upgrade during the past three years outside OBR. Roughly half of these projects were renovations to existing facilities and half were purchases of efficient lighting, motors, or equipment.

Of three participants using non-OBR financing, each used a different type – a state agency loan, a line of credit, and a municipal bond. Of eight participants that paid at least some cash, two reported they did not qualify for financing, two said the amount was too small to need financing, and two said they wanted to avoid new debt. Two did not specify why they did not use financing.

In comparison, 24 (69%) nonparticipants made one or more major facility improvements or equipment upgrades during the last three years. Similar to participants, these were about evenly divided between new construction or renovations to existing facilities, and purchases of new efficient lighting, motors, or equipment, or replacement of inefficient or failed equipment.

Surveys did not ask rebate-only participants about other energy efficiency upgrades they completed; rather, surveys asked how they paid for the remainder of a project when they did receive a National Grid rebate. The majority of respondents (71%) used cash to pay for the remainder, while 20% used some form of financing. (Nine percent of respondents indicated "other" or did not know.)

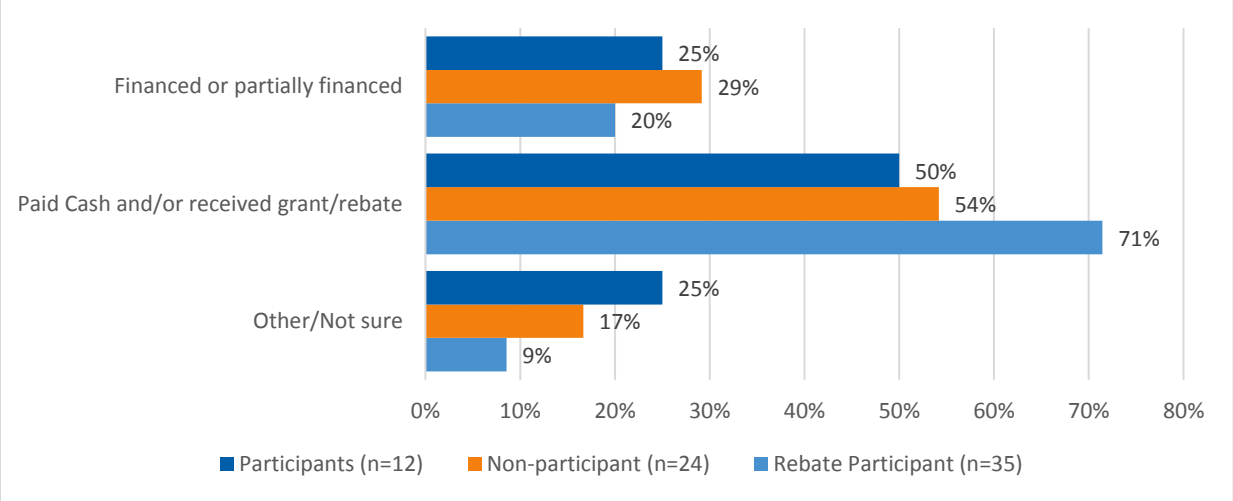
The majority of non-OBR respondents (58%) cited saving energy and saving on energy costs as a primary reason for making improvements to their facilities (less than participants, of whom 84% cited this reason). Other common reasons included replacing old or failing equipment (22%) and upgrading to better-functioning equipment (14%).

Non-OBR respondents, using cash exclusively or in combination with other payment methods, said: they did so to avoid taking on additional debt; amounts were small and did not require financing; or they did

not like to use financing. One of the three respondents with projects too small to qualify for financing said it was somewhat likely they would have increased the project's size had funding been available.

Figure 18 shows payment methods used by participants and nonparticipants.

Figure 18. Customers' Method of Payment for Non-OBR Projects*



*No other rebates were used to finance the remaining project amount *after* the National Grid rebate was applied.
Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Participant Survey. Question C8: How did you pay for those projects? Did you pay cash, finance, receive a grant or rebate not from National Grid, or use a combination of those? (n=16). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, Question D1: Same wording as participant survey. (n=24). National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question D1: How did you pay for the remainder of the project cost, after the National Grid rebates were applied? Did you pay cash, finance, receive another grant or rebate, or a use a combination of those? (n=35) Percentages may not total 100% due to rounding.

Table 24 shows types of financing non-OBR respondents received. Responses did not vary enough between nonparticipants and rebate only participants to warrant separating the data. Interest rates varied by the financing type used. For example, municipal bonds carried 1% and 2% interest rates, the credit line carried a 3% rate, and the equipment lease carried 4.32% interest rate.

Table 24. Financing Tools Used by Non-OBR Groups

Financing Tool	Nonparticipants
Line of credit	1 (7%)
Unsecured loan	1 (7%)
Municipal bond	2 (14%)
Equipment Lease	1 (7%)
Energy Services Contract (ESCo)	1 (7%)
Other*	6 (43%)
DON'T KNOW	2 (14%)

*Other responses include use of a state revolving fund loan, a low interest loan for nonprofits, All National Rebate, and three responses said they used OBR through National Grid (these three customers had been participants on earlier projects. Cadmus believes they were referring to those projects).
Source: National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – No Participation, and National Grid-RI, Large Commercial and Industrial On-Bill Financing Program Market Assessment Survey – Rebate Only, Question(s) D5 on both surveys. What type of financing product did you use? (Combined n= 14)
Percentages may not total 100% due to rounding.

Nonparticipants were more likely than rebate only participants to say that finding affordable financing was *not at all easy* or *not too easy* (31% compared to 14%). This may relate to the fact that nonparticipants are more likely to use financing than rebate only participants (see Figure 18). In both cases, the number of respondents indicating financing may be difficult is far greater than the current market penetration of the OBR program. Those who faced barriers said they already had too much debt, did not qualify for affordable financing or faced internal organizational barriers (primarily for government and nonprofits).

Of all respondents (i.e., participants and nonparticipants), 46 (48%) said they considered project payback when considering financing options. These respondents most frequently required a maximum payback within two to four years. The second-most cited consideration was interest rates (for non-OBR groups) and overall convenience of financing (for participants).

Conclusions and Recommendations

Is OBR performing optimally, operating effectively, and does the program's design conform to industry best practices?

Conclusion: The OBR Program design is appropriate to program goals, conforms to industry standards, and results in satisfied customers. Participation in the OBR program is increasing as fast as program staff will allow, and 94% of participants were somewhat or very satisfied with their experience. Benchmarking the OBR program design and performance revealed that the OBR program has similar design elements to other programs targeted to large commercial customers, and that OBR participation is comparable to participation in other programs. The increase to the 5-year maximum tenor brought the OBR program in line with other programs, which all have the same or longer maximum tenor.

Conclusion: The OBR Program requires substantial future allocations to the fund in order to fulfill its potential for increased participation. Cadmus considers that substantial opportunity exists for OBR to continue to grow. If participation in the fund continues to grow over the next few years at the present rate, about 60% a year, the fund will require at least the projected $28 million over three years in order to remain solvent for the next five years. That level of growth in participation will likely subside over time, as the market becomes more saturated, and National Grid staff have the ability to extend the period of growth by reducing the rate of growth. The cashflow analysis found that at 10% annual growth, the fund balance declined slowly enough that the fund remained solvent for almost 10 years with a single allocation of $1.5 million. Due to an estimated 1.5% default rate, the fund balance will always be slowly declining, and will always need some periodic allocations of funding to remain solvent, unless the program charges interest.

> **Recommendation:** Consider setting formal targets for savings and participation in the fund, and establish a funding schedule that will support the projected participation, and protect against defaults. Stable funding will give program managers the ability to better leverage the dollars available in the fund, and be accountable for meeting expected performance. Setting either a funding target, or a savings and participation target, will be sufficient to allow National Grid staff to utilize all funds, but manage to whatever constraint they face.

Conclusion: National Grid may be able to legally charge interest on OBR financing, but the benefits are not worth the negative impacts. The interview with National Grid legal counsel and information provided by the DBR representative did not indicate any reason why National Grid would NOT legally be allowed to charge a low interest rate for OBR loans, though the company may be required to obtain a mortgage license for certain customers or projects. However, previous research related to charging interest was tangential, determining only that it was not in National Grid's best interest at the time and not drawing a formal conclusion as to whether it was possible.

There are benefits to National Grid from charging interest, but Cadmus does not consider these sufficient to outweigh the drawbacks. An interest rate just above the default rate would allow the fund to eventually reach a stable state where repayment provides sufficient funds for financing new projects,

and no allocations are necessary to cover defaults. However, charging interest, even if the rate of increase in participation dropped from 60% to 10% annually, would not grow the fund quickly enough to meet demand. Charging interest would make the OBR program less costly to National Grid, but at the cost of reduced participation (relative to not charging interest). Survey results indicated a 2% interest rate would decrease the current participation level by about 40%, and at 6% interest, customers will look elsewhere for financing.

> **Recommendation:** Cadmus does not recommend the utility pursue an interest charge at this time, though the utility may want to revisit this issue in the future when the fund reaches a more stable level of participation. Before pursuing an interest charge, National Grid should commission legal research to definitively identify the legal requirements for the utility to charge interest, and assess the time and resources required, and potential risk. However, in the near term and regardless of whether National Grid elects to pursue charging interest or not, National Grid staff should internally review the opportunity cost to provide funding to the OBR program at 0%, and monitor that cost on an annual basis.

Conclusion: The OBR Program may benefit from more clearly defined objectives and annual performance targets. Program staff mentioned that one goal of OBR is to offset incentive payments, making National Grid's LCI energy efficiency programs more cost-effective. However, OBR financing continues to be used primarily as a sales tool after the sales team has proposed a project, which limits its ability to influence potential customers. In addition, there are no quantitative targets for participation or overall savings for the OBR fund, and program managers expressed uncertainty over future allocations to the fund. As a result, staff tend to release only about half the available funding in any given year. Finally, while shifting some incentive funds from rebates to OBR could potentially be more cost-effective, there is still a cost to the utility. Program managers were aware of the administration budget and the amount of money requested to be allocated to the fund. But program staff could not estimate other costs, such as the opportunity cost of providing capital at 0%, the exact cost of defaults, or the cost of negotiating arrearage plans (and thereby extending the cost of capital). This makes it difficult to evaluate the true relative cost of offering incentives and financing offers to LCI customers.

> **Recommendation:** Program managers and other National Grid stakeholders should evaluate whether financing's purpose is to encourage more cost-effective energy savings, drive deeper savings per project, drive increased participation, or some other goal or combination of goals. Clearly defining this objective will provide National Grid staff with direction for evaluating program costs, planning and budgeting for future program years, and adjusting program design to optimize OBR program performance.
>
> Assuming that National Grid determines that the goal of OBR is to offset some of the rebate cost, staff should pursue the following actions:

- Find ways to introduce OBR earlier in the sales conversation with customers, and look for opportunities to use OBR as a conversation starter. For example, it may be worth contacting high-usage customers in the government, education or manufacturing sectors to let them know that OBR financing is available and has unique benefits not available elsewhere – such as 0% interest, and no impact on available credit. This will allow OBR to drive energy efficiency in its own right and may attract a different type of customer, or allow customers to think about their projects in a different way.
- As noted above, staff should propose quantitative targets for the program annual performance. This will allow managers to optimize the available funds.
- Staff should investigate the actual cost to the utility of offering financing at 0%, as well as the added costs from extending financing through arrearage agreements, and the cost of nonpayments (default). While these costs may be minor an may not need to be tracked on an annual basis, staff should establish a baseline and periodically review costs to ensure the utility is able to correctly evaluate the relative cost of OBR compared to rebates.

What impact does LCI OBR have on customer decision making?

Conclusion: Based on survey responses, 78% of participants would not have proceeded with the same project at the same time had they not had access to the financing in addition to the rebates. The attribution analysis showed the net participation rate for financing to be 78%, indicating that while customers seem to place more emphasis on rebates, financing was still an important factor for driving participation and savings. Further, half the participants that considered they would have proceeded with their project without financing did indicate they would have installed fewer measures. Finally, slightly fewer participants (61% compare to 53%) would have installed their project within the same year with only rebates as opposed to only financing. As a result, Cadmus concludes that financing in addition to rebates not only motivated customers to move forward at all, it allowed customers to increase their scope and accelerate the timing of their projects.

> **Recommendation:** Eliminating either rebates or financing will likely reduce program participation; however, the absolute value of the incentive may not be as important as its general availability. National Grid may be able to experiment with reducing rebate levels when offering financing, but National Grid staff should monitor participation rates to assess changes in overall participation and project scope.

What is the demand for financing, and what are the financing needs and preferences among LCI customers in Rhode Island?

Conclusion: There is significant opportunity for energy efficiency upgrades among LCI customers, as well as significant demand for financing.

The study shows that there is a substantial market for OBR still untapped. Participation in OBR represents only a tiny fraction of LCI customers across all sectors. In addition, 64% percent of participants and 69% of nonparticipants (not including rebate-only respondents) have made energy

efficiency improvements in the past 3 years, indicating high level of interest and activity related to energy efficiency. Many nonparticipant respondents believe further opportunities exist to make improvements in their facilities to reduce their energy costs.

Survey results indicate that between 14% to 31% of non-OBR customers consider financing difficult to find, while the penetration of the OBR program is only around 2.5% of LCI customers. In addition, the OBR financing is both more affordable and easier than private market financing, since it offers 0% interest and has very limited underwriting requirements. Therefore, it offers a financial benefit even to customers that do not have difficulty finding affordable financing, but may be reluctant to invest in energy efficiency.

> **Recommendation**: If funding is available, consider broadening promotion of OBR to a wider audience. For example, using a cohort model in which similar customers (based on business type, operational challenges, etc.) are paired or grouped together, invite a participant spokesperson and targeted nonparticipants to a lunch-and-learn to discuss the potential of OBR. National Grid staff should be present to facilitate this session, and can use the session to also identify specific barriers facing customer sub-segments (e.g., schools, government agencies). This limited approach to broader market awareness will allow program staff to observe less artificial market response, and better evaluate the potential of OBR to offset incentive levels. Program staff will also learn about messaging to use to promote OBR, in ways that might drive larger project size or greater participation. For example, some respondents indicated they could not take on more debt. These respondents may not realize OBR financing is off-balance sheet and will not impact their ability to borrow for other purposes, or that the 5 year tenor can make projects more manageable on a monthly basis than they anticipate.

Conclusion: Customers who own their own buildings and are aware of their energy costs may be more likely to participate in the OBR program. The majority of participants own their buildings and understand their electricity costs as a percentage of monthly expenses. While these participants fall across a variety of business sectors, more than one-half are in Manufacturing or Government and Municipalities. Similarly, nonparticipants who own their buildings and exhibit opportunity for OBR, are also in Manufacturing and Government, followed by Education, and Finance/Insurance /Real Estate.

> **Recommendation:** Formalize the desirable characteristics of ideal participants and provide these to sales executives and other stakeholders who play key roles in identifying and offering OBR to customers. C&I Sales team staff should ensure that customers in target OBR sectors who own their facilities are aware of their monthly energy costs, to allow them to gauge the importance of these costs relative to other expenses, as this might drive interest in energy efficiency and OBR.