

Integrating Demand Side Bidding with an Existing New Construction Efficiency Program: Differentiating Early Retirement Retrofit and New Installation

*Joseph Paruolo and Gary Krieger, KeySpan Energy
Eric Belliveau and Jonathan Kleinman, Optimal Energy, Inc.*

ABSTRACT

Long Island Power Authority (LIPA) continues to experience significant growth in demand for electricity. Over the past seven years, the Island's population has grown by 5.7%, representing 172,000 more people to serve. Since 1999, LIPA has operated nine energy efficiency programs called the Clean Energy Initiative (CEI). As part of the CEI, LIPA operates a commercial construction program (CCP) addressing new purchases of equipment and systems in new and existing buildings.

Although the program continues to meet its kWh and kW goals, LIPA wishes to extend its reach in the existing buildings market. In 2003, LIPA issued a Request for Proposals (RFP) for 75 MW of demand savings from existing buildings. The resulting program is the Retrofit Energy and Capacity Program (RECAP)¹.

Many program administrators who offer both early retirement retrofit and lost opportunity programs², grapple with the issue of how to categorize projects and prevent exploitation of differing incentive structures by customers.

This paper explores the challenges integrating a demand-side bidding initiative delivered by a contractor – RECAP -- with an existing LIPA-delivered new construction program. We address how LIPA's definition of early retirement retrofit guides the sometimes contentious boundary between the two programs.

The paper details incentive designs, implementation protocols, and MWh and MW results of both programs. We explore the differences in:

- What information is best shared when customers are solicited
- How project implementation is monitored and verified
- How early retirement retrofit and lost opportunity savings and costs are calculated

The paper uses actual cost and savings data from both programs to compare project level economics using cash flow analysis and internal rate of return. We will show the latest solutions for synchronizing the delivery of the two commercial and industrial (C&I) initiatives.

¹ Details of RECAP were presented at this conference in 2004; the proceeding title is, Yet Another Look at Demand-Side Bidding: Long Island Power Authority's 75-Megawatt Efficiency RFP.

² Lost opportunities refer to the replacement of failed equipment with energy-efficiency equipment or the construction of new buildings; if energy efficiency is not promoted at the time of replacement, the energy savings are considered "lost."

Introduction

Utility Description

LIPA is a corporate municipal instrumentality and political subdivision of the State of New York (the Authority). Its subsidiary, the Long Island Power Authority (LIPA), provides electric service to customers in Nassau County, Suffolk County, and the portion of Queens County known as the Rockaways. LIPA provides electric service over approximately 1,300 miles of underground and overhead transmission lines to over 1 million customers.

LIPA's consistent rise in demand has prompted a commitment to cost-effective conservation to minimize construction of additional transmission and generation resources for Long Island. LIPA already offers an array of energy efficiency, renewable energy, and demand response programs as part of its \$37 million per year Clean Energy Initiative.

Commercial Construction Program

The Commercial Construction Program is the largest program of LIPA's Clean Energy Initiative. The CCP promotes a range of energy-efficient electric technologies and design opportunities through incentives, education, and information and technical assistance. The CCP is implemented directly by LIPA staff and is open to all commercial new construction, renovation, and equipment replacement projects in the LIPA service territory. The program savings have come mostly from the largest energy users but have project distribution throughout all customer classes.

CCP includes three components: Prescriptive, Custom, and Whole Building³:

1. The **Prescriptive track** provides financial incentives to customers who purchase and install qualifying energy-efficient electric equipment; qualification is determined from a list of technologies that exceed both current code requirements and standard practices in the marketplace. The list is representative of the most commonly installed and best understood equipment available: HVAC, lighting, and motor. Unit savings are predetermined from engineering algorithms⁴.
2. The **Custom track** offers financial incentives and technical assistance to customers who install cost-effective energy-efficient equipment, or design more complicated improvements than those in the Prescriptive track.
3. The **Whole Building track** rewards participants with the greatest energy efficiency by encouraging building owners, developers, and architects to design and construct the most energy-efficient buildings from the outset of a construction project. Custom and Whole Building programs differ in the comprehensiveness of the savings: Whole Building incentives require the applicant to include at least three building systems, e.g., HVAC, lighting, building shell. The Whole Building track provides incentives for all new construction and major renovation projects.

³ Custom and whole buildings refer to LIPA's approach for newly constructed buildings.

⁴LIPA uses a variety of sources for prescriptive savings including regional HVAC savings estimates from Cool Choice, Northeast Energy Efficiency Partnerships, Inc. and motor savings from the Energy Policy Act.

We compare only the Custom and Whole Building components of the CCP with RECAP for the purposes of this paper.

Incentive levels. CCP incentives are based on the incremental cost difference between a baseline technology or design, and more efficient ones. LIPA contracts with several technical assistance (TA) providers to perform energy modeling of interactive systems. TA contractors develop energy cost and savings that form the input for LIPA's project screening and analysis tool⁵. In the custom track, the screening tool calculates a maximum incentive based on 60% of the incremental cost of the installed measure but incentives are negotiable. The whole building component⁶ uses 90% of incremental cost to encourage comprehensiveness.

The project incentive calculation determines the maximum incentive using the lesser the following criteria:

- 60% (custom) or 90% (comprehensive) of incremental cost
- Customer payback buydown to 2 years for custom, or 1 year for comprehensive
- Utility electric benefits⁷.

Beginning in 2006, LIPA introduced a new method of determining incentives. LIPA's program staff now employ a screening tool that uses project savings and cost data as the source for a cash flow analysis. Now, once the project screening tool has determined whether the project is cost effective, program staff use customer feedback, cash flow analysis and internal rate-of-return calculations to refine incentive offers. The process is quite simple.

Program staff ask customers seven questions (defaults are inserted if the information is unknown):

1. Will the customer get outside financing for the project?
2. Will the customer use a loan or a lease?
3. What will be the term?
4. What will be the rate?
5. What is the amount of additional funding for the project?
6. What will be the customer's down payment on the loan or lease?
7. How will the incentive be used? (Will it affect the loan amount or not?)

⁵ LIPA's custom screening tool was co-developed with Optimal Energy, Inc and the authors of this paper.

⁶ The whole building track requires multiple systems and participation in LIPA's commissioning process.

⁷ Utility electric benefit is the value of the electric savings to LIPA; it is not affected by the benefits accruing to the customer.

The answers to these questions return a set of incentive guidelines:

- Amount for an Internal Rate of Return (IRR) of 25% = XXX
- Amount for an IRR of 50% = XXX
- Amount for an IRR of 100% = XXX
- Amount for a Net Positive Cash Flow = XXX
- Amount for a 0% Interest Rate Equivalent = XXX
- Maximum Calculated Incentive = XXX

Any of these parameters can be used to determine an incentive range although the maximum is based on the decision rules discussed above. The idea is to use customer feedback to customize the incentive both satisfying the customer and increasing the dollars per kWh yield for the program. For instance, if feedback indicates a specific customer makes decisions based on IRR then an IRR calculation can be used when presenting the project; if achieving positive cash flow will sway a decision toward an energy efficiency investment then it can be used. Presenting projects using more sophisticated investment criteria divert the discussion away from more rudimentary simple payback decision rules.

Program Outreach. LIPA like many utility administrators uses a variety of marketing and outreach approaches to overcome the market barriers that exist for commercial and industrial customers. Outreach staff include:

- Major Account Executives work directly with LIPA's top 250-300 largest customers representing approximately 10,000 meters
- Economic Development Staff work within LIPA's economic development zones where they provide business attraction and expansion rates, incubator rates, manufacturing competitiveness rates, and Empire Zone rates
- C&I Energy Services provides project management for applications over \$5,000
- Circuit riders are contractors with two different responsibilities:
 - Trade ally relations – periodic visits to a variety of trade allies
 - Lead procurement – monitoring building permits, visiting sites, funneling leads to other LIPA staff and lead follow up.
- Technical assistance contractors provide customers with project-specific cost and savings information for use in cost effectiveness determinations
- Outreach by program management staff⁸ is reserved for information sharing with high-value architects and engineers, and large customers

The program manager dispatches these resources according to seasonal or monthly metrics and milestones.

⁸ LIPA's CCP program managers do not control the sales staff. Both program management and sales staffs meet with customers, while program outreach including trade ally work and circuit riding are performed only by program staff and contractors.

Program Results. Table 1 shows the 2005 results from the Commercial New Construction Program.

Table 1. 2005 Commercial Construction Results

MW	5.073
MWh	20,657
Incentive Dollars	\$5,053,331

Retrofit Energy and Capacity Program (RECAP)

Missing from LIPA’s CEI were two large opportunities for energy savings (not covered by the CCP): an initiative that included more small commercial customers, and incentives designed to induce true early retirement retrofit projects. Smaller customers compose roughly 90% of the C&I customer list and 40% of the total C&I load. Most of the CCP direct outreach effort is spent on large customers, not surprisingly; the majority of megawatt hours harvested through the whole building and custom components of the CCP were from larger customers.

In 2003, LIPA issued an RFP for 75 MW of demand bidding to initiate the RECAP program, and engaged five Energy Service Companies (ESCOs) to implement. RECAP is designed to expend significant resources on early retirement retrofit opportunities in the facilities of smaller customers.

Small customers have different needs than large ones. Small customers are time-constrained, lack expertise to distinguish between efficiency technologies, and are too risk averse to undertake the installation of efficiency measures without sufficient motivation. LIPA formulated contractual requirements for RECAP ESCOs that resulted in them developing strategies expressly for the small customer market.

Other states have gathered useful data to characterize smaller customers. California’s “1999 State-Level Small/Medium Nonresidential Measurement and Evaluation Study” concluded:

- Small customers were no more likely to remodel than large customers
- The smallest (<20 kW) are half as likely to remodel as other customers
- Cooling systems change in about 20% of remodels
- Lighting is replaced in approximately half of the remodels
- Over 60% of remodels replaced lighting and cooling equipment with equipment of comparable or better efficiency

RECAP makes it easy for eligible customers to participate: Competitively-selected program contractors solicit customers, “sign out”⁹ customers in LIPA’s database, and approach consumers directly as a “one-stop shop” for design, cost benefit analysis, and installation of energy efficient measures. After the ESCO has completed the work, third-party measurement and verification contractors review the work and determine measure applicability, verify project savings and establish whether future verification efforts are necessary. Once the work is verified,

⁹ Signing out refers to an ESCO removing the customer from being solicited by another ESCO when a contract is finalized. The customer signs an affidavit stating they’ve entered into a contract with the ESCO to do the work. This causes the “sign out” to eliminate other ESCOs from approaching that same customer.

the ESCO is paid by LIPA, and the transaction is complete. Project information is then uploaded into the web-based tracking system for review and compilation.

Evaluation will be undertaken after two full years of program operation.

Incentive levels. RECAP does not have published incentives due to the different private businesses delivering the services. Incentives are based on the installed cost of early retirement retrofit measures. Installed cost includes the labor to take out the old technology and install the new. Incremental cost includes only the *difference* in labor--higher or lower--over the baseline.

ESCOs use several marketing approaches to attract customers:

- Provide incentives to trade allies for each system installed, resulting in a 20-30% reduction in measure cost to the customer
- Install for free to multi-family customers¹⁰
- Offer larger customers pricing that shortens the payback to 5 years or less
- Design co-pays to fit the market: 0% co-pay for small customers; co-pays for larger customers average a one-year simple payback

Any of these methods may include a cash flow financial package tailored to the customer needs.

Program outreach. RECAP program outreach is performed by the contracted ESCOs. LIPA has a limited role in advertising or other marketing. LIPA developed a brochure describing the RECAP program for use at trade shows and for the account managers to provide information to their customers. A LIPA e-mail newsletter was sent to subscribers with information about the program. LIPA's website mentions the program only by referring customers to a participating ESCO. This limited marketing approach is being monitored. If participation in the program falls below expectations, additional promotional material will be issued.

Program results. Table 2 shows the RECAP program results to date through April 2006.

Table 2. RECAP Results to Date Through April 2006

MW	0.449 ¹¹
MWh	2,085
Incentive Dollars	\$444,527

Customer Participation Process Comparison in CCP and RECAP

Both programs lead customers from application to installation. The processes depicted in Figure 1 are simplified versions of the program tracks.

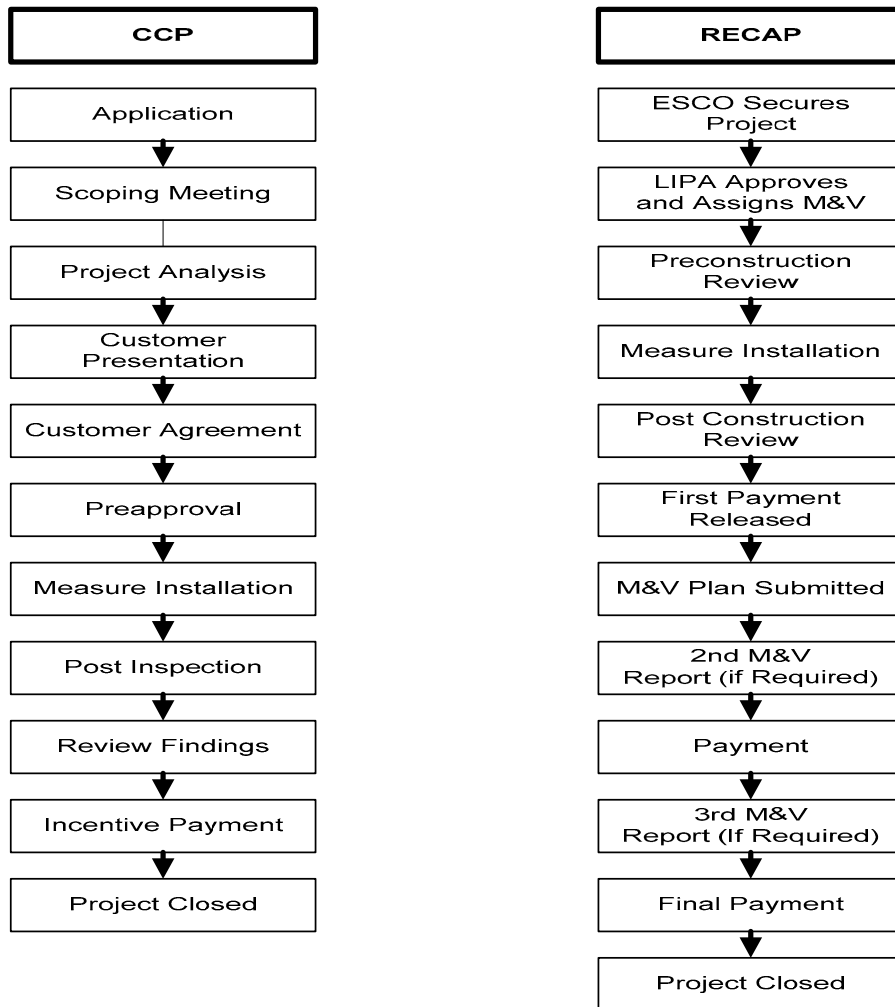
CCP has a relatively simple process depicted on the left. Customers apply to the program, have their project evaluated, receive confirmation, install measures, and then receive incentives.

¹⁰ Multifamily buildings, described as more than 4 units, have particularly high barriers to energy projects. For the ESCO, it is hard to attain favorable margins without full participation. For unit inhabitants, it is hard to invest money in something they do not own.

¹¹ Savings algorithms provided by ESCO.

RECAP has a more complicated process for LIPA, though for the customer it is simpler: Project costs and savings are presented by the ESCO; a customer contract is signed; the project is installed and verified; and the customer's contribution is collected. Several transactions occur out of customer view, such as measurement and verification that may take up to three years to complete.

Figure 1. CCP and RECAP Program Tracks



The most significant differences are how measurement and verification is handled and when incentives are paid.

Problems with Program Definitions

CCP is defined as a lost opportunity program and RECAP as an early retirement retrofit program. A definition for an early retirement retrofit project is removing fully functioning equipment in the first three-quarters of its measure life. Lost opportunity programs deal with only new equipment resulting from equipment failure and new construction.

A challenge arises when utility staff have to explain to their customers the differing incentive offers. If an ESCO participating in RECAP convinces a customer to replace a fully functioning but inefficient T12 lighting system, the incentive is based on the installed cost of the new lights. If the same customer comes to LIPA through the CCP and wants to replace their T12 lighting system, the project is categorized as a lost opportunity; the incentive is based on the fixtures' incremental cost.

Differences in how incentives are calculated are due to how utilities count savings and establish cost-effectiveness. Whether an incentive is available, and its consequent amount, stem from how costs and savings are determined. How do you differentiate T8 replacement measure savings from T8 early retirement retrofit savings?

Savings from a replacement T8 lighting system are simply the savings delta between the new efficient equipment compared to the minimum baseline of what would have been installed. The more efficient system produces quantifiable savings over its life. When calculating savings from early retirement retrofit measures, other considerations depend upon timing:

- The first timing calculation is a reduction in expected savings from early retirement measures, at the point the original equipment would have been replaced in the normal replacement cycle. The baseline shifts from the energy intensity of the original equipment to that of the new equipment that would have been installed anyway.
- The second timing calculation is an estimate of incremental costs for early-retirement investments. By interrupting the natural replacement cycle, early retirement permanently alters the future replacement cycle.

Other relevant considerations beyond the scope of this paper include operations and maintenance savings, future replacements, and subcomponent life. These factors are important to the utility in determining incentives--but not to the customer.

The way savings are counted is only relevant to customers as it pertains to their bill. They want to know in simple terms why they should pursue a more efficient approach than they had contemplated. Program administrator staff need tools and training to provide customers with the answer.

Tools

Table 3 depicts a simplified project through the eyes of the customer:

- In the first case, the customer takes an opportunity to install a new lighting system, pays a \$5,000 down payment, and either leases or takes out a loan to complete the project¹². No incentive is applied
- The second scenario goes through the same purchase with a typical retrofit program applied where the incentive is based on 50% of the installed project cost
- The third scenario is this same project applying a new construction/replacement program incentive based on incremental cost

¹² We are assuming the customer finances the project in each case. Whether they do or not, the opportunity cost of the customer's capital must be considered.

Table 3. Example Project from Customer Perspective

Program Track	No Program	Retrofit	Replacement
Project Cost (installed cost)	\$70,000	\$70,000	\$35,000
Materials (incremental cost)	\$35,000		
Labor (already assumed in Replacement)	\$35,000	\$35,000	\$0
Utility Demand Savings kW	32.5	32.5	28.5
Utility Energy Savings kWh/yr	112,228	112,228	97,928
Customer Energy Savings kWh/yr	112,228		
Customer Savings per year	\$15,080		
Utility Financial Incentive	\$0	\$35,000	\$24,500
Simple Payback years	4.64	2.32	3.02
Customer Investment	\$5,000		
Annual Payment (\$70,000, five-year term at 6%)	\$15,080		
First Year Cashflow	\$-5,000	\$3,120	\$684
Second Year Cashflow	\$0	\$8,120	\$5,684
Internal Rate of Return (20-year measure life.)	46%	164%	118%

Notice how differently the same project can be perceived by parties in a transaction. When the program administrator asks the customer to make an investment, it is not always clear what will persuade a customer. Original practices focused on an offer to “buy down” the simple payback. This method is counterproductive for the following reasons:

- A simple payback calculation is a one-way street: It puts pressure on the program staff to reduce the payback time by increasing the incentive
- Simple payback is a blunt tool when comparing unlike projects. It is like comparing stocks on the basis of their price/earnings ratio while ignoring other considerations such as capital appreciation and income
- First cost, the most significant barrier and basis for setting the majority of incentives, is *not* the primary motivator for every business investment decision

In the past LIPA staff would issue a commitment letter with the maximum incentive allowable based on the decision rules mentioned above. The letter would include the screening tool output listing the savings, costs and the simple payback. Current commitment letters do not include simple payback and have incentive amounts based on the new criteria.

LIPA staff does not negotiate in person or on the phone with every customer. In most cases the “negotiated” incentive offers are included in a letter. If project sizes are large, individual presentations are made, but staff does not engage customers in discussions of simple payback. Staff that are able to sell *all* project attributes are more likely to satisfy customers that the offer is fair and reasonable. Customers do not understand the incentive differences between

early retirement retrofit and replacement. One key to satisfying customers is to show them a project-specific analysis. Though not all customers will finance efficiency investments, they are aware that there is an opportunity cost to their available capital which the cash flow analysis represents. How can customers decide which investment to choose among the many presented every day?

The table shows LIPA's alternatives when negotiating incentives: internal rate of return and cash flow. The internal rate of return for all three methods is impressive; any alternative would make the eyes of a CFO light up. Internal Rate of Return (IRR) neutralizes any request for an increased incentive. Even with no incentive, the project would surpass most corporate hurdle¹³ rates; no customer will ask LIPA to provide an incentive that increases their rate of return above 118%.

LIPA realized something when they implemented the new cash flow and IRR tool: They had been overly generous. Customers used lots of criteria to determine how they would invest their money; it was not always how quickly the investment paid for itself.

Much of society, smaller businesses included, has come to view capital purchases in terms of monthly or yearly payments—the effect on cash flow. Using simple payback ignores this important shift. In early retirement retrofit and replacement examples, the customer has first-year positive cash flow from the investment. Cash flow comparisons provide the same results as the internal rate of return analysis. Increasing the incentive only improves an already rosy picture. ESCOs identify the IRR acceptable to customer and then revise their incentives to maximize profitability. As an example; if a customer's threshold is 24 month payback on capital improvement projects, ESCOs will present a proposal that will bring the payback to 22 months increasing the odds that the customer will enter into a contract with them to perform the work.

Areas of Consideration Between CCP and RECAP

Five areas generate most of the conflict between the programs:

- **Retrofit or replacement.** As LIPA sales staff strives to please the customer, they often find themselves in a dilemma: They have a customer relationship through CCP, but incentives can be higher through RECAP. Staff struggles to determine which track to recommend to their customer.
- **Intent.** It is frequently hard to discern whether the customer truly intended to replace the equipment anyway resulting in the CCP track, or if they were convinced to do so to capture the larger incentive that accompanies RECAP.
- **Savings targets.** As RECAP was being formulated, CCP was setting performance goals and metrics. In the past, CCP had a significant number of retrofit/remodeling projects processed with incremental cost incentives. Savings targets have to be adjusted.
- **Policing pre-inspection results.** Pre-inspections are essential to determining which track is best for a project to follow. Properly done, the existing equipment is reviewed and determinations are made for which program it qualifies. In certain cases the project has components that use both programs.

¹³ The required rate of return in a discounted cash flow analysis, above which an investment makes sense and below which it does not. Often, this is based on the firm's cost of capital or weighted cost of capital, plus or minus a risk premium to reflect the project's specific risk characteristics.

- **Hours of operation.** The hours of operation for individual technologies differs between the two programs. ESCOs had different engineering algorithms than CCP staff were using.

Solutions

- **Don't let utility definitions of savings set incentive calculations.** Approach each project as unique. Some projects will include elements of both programs: Retrofits combined with gut rehabilitation. Make sure program integration makes this seamless for the customer.
- **Concentrate on the customer.** Providing an acceptable incentive requires customer interaction. No silver bullet or single rule will make this easier. Program administrators have a responsibility to ratepayers to provide services in the most cost-effective manner. Tailoring incentives from customer feedback can actually reduce the overall cost of program delivery.
- **Do not try to make program distinctions to the customer.** Both programs are solutions for LIPA customers. A few simple answers can move the customer down one program track or the other without conflict.
- **Use cash flow and Internal Rate of Return instead of simple payback.** These tools, as part of a balanced sales approach, reduce friction between the programs by shifting the focus off the differences and onto the investment itself. Assuming a five-year loan and reasonable interest rates, buying the customer payback down to two years creates immediate and significant positive cash flow for all projects. Cash flow needs to be part of incentive calculations.
- **Remove gaming potential.** Program staff established clear and consistent hours of operation and savings algorithms between the programs. If an ESCO wishes to have different hours of operation than those in program rules, they are free to meter and submit any project on a custom basis. Custom projects receive 30% of project cost after installation and require that M&V be carried out for at least one year after installation and, depending on the type of measure, sometimes two. Stipulated measures are paid for in full upon completed post-installation inspection. Program participants can weigh the difference.
- **Establish program metrics beyond kWh and kW goals.** This removes the pressure on program staff to lower goals in anticipation of program integration. Program staff cannot be responsible for regional changes in the economy.
- **Provide strong Measurement and Verification processes to confirm program track choice.** Trained M&V contractors can ensure applications move down the correct program path.

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