

Complete Energy Solutions: Delivering Comprehensive Savings to the SMB Market

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ABSTRACT

Armed with stimulus funds, the Sacramento Municipal Utility District (SMUD) was able to test a new approach to delivering comprehensive energy savings to the small and mid-sized business market (SMB). The challenge was to develop a full service efficiency program that would be cost-effective for SMUD, attractive to customers, reduce utility risk, and encourage comprehensive retrofits, all while conforming to Federal funding and local permitting requirements. In little more than a year, the new Complete Energy Solutions program was already so successful that SMUD doubled the size of the program contract. Project incentives were capped at 60-80% of project cost and there was no formal financing available; nevertheless, the program administrator was able to convert 25% of audits into completed projects and deliver average savings of more than 17,000 kWh per customer. Even more impressive, half of the savings came from non-lighting measures, and of the roughly 50% savings from lighting, half of that came from LEDs.

In this paper, we will describe the innovations in program design that enable this program to successfully deliver comprehensive retrofits for the SMB market. These include an incentive structure that both ensures program cost-effectiveness and motivates the program administrator to seek comprehensive projects; streamlined permitting strategies; attention to trade ally management; careful quality control; and providing a seamless customer experience.

Background

Leading up to 2010, SMUD's energy efficiency programs serving the SMB market were typical of many utilities: contractor driven, prescriptive programs that focused on low hanging fruit (i.e. primarily lighting). The programs were fraught with contractor abuse and provided limited customer value because of cream-skimming by contractors. But year after year, these programs cost-effectively delivered almost 10% of SMUD's entire energy efficiency portfolio savings. While we recognized that the future of energy efficiency would require a more comprehensive approach that bundled measures for deeper savings, it seemed risky to abandon the tried and true programs in favor of a potentially costly program model ... and one that may or may not garner significant customer uptake.

When the recession hit, decreasing profit margins caused many smaller establishments to go out of business, and those who "stuck it out" were just barely hanging on. These economic challenges were compounded by SMUD electricity rate changes that imposed Time-of-Use pricing on all commercial accounts and demand charges on accounts over 20kW. Small commercial customers were increasingly approaching SMUD with high bill complaints and/or requests for audits, yet SMUD lacked the resources to provide this level of customer care.

In 2009, along came stimulus funding from the American Recovery and Reinvestment Act (ARRA). The City of Sacramento approached SMUD about using some of the City's ARRA funds to help small commercial businesses reduce their energy bills. This was our big opportunity! About that time, SMUD also joined several other California jurisdictions in a bid

for ARRA funds through the Better Buildings Program, and won that as well. This gave SMUD a total of \$1.7 Million with which we could experiment with a new SMB program design.

The remainder of this paper describes the program design challenges, innovations, successes, and lessons learned for SMUD's "Complete Energy Solutions" program.

Program Design

Because this was an entirely new programmatic approach for SMUD, we chose to solicit a third party Program Administrator (PA) that would bring knowledge and experience to the program. Rather than allow bidders to propose their own program structure, however, SMUD specified many of the program requirements and processes. Willdan Energy Solutions (Willdan) won the first solicitation and served as PA for the duration of the ARRA grants (two years).

Customer Size

For the two-year pilot period, the program focused entirely on customers with a peak demand less than 300kW, as this was the customer segment with the least program options and the greatest need for hands-on energy assistance. Furthermore, because a good share of the program funding came from the City of Sacramento, and the City's focus was on the smallest of businesses, a substantial portion of the program focused on businesses with a peak demand under 50kW. SMUD's target was to provide energy efficiency retrofits for 400 SMB customers.

Guiding Principles

After reviewing case studies and speaking with other utilities, it became clear that any successful program in the SMB space must be "turnkey and hassle-free." The reasons for this are twofold: SMB customers typically lack the energy experience to manage their own energy projects, and have little time or resources to focus on anything other than their core business. "Turnkey and hassle free" thus became our overarching design principle.

The following are some of the other principles that guided our program design:

1. *Comprehensive*: The program must be "comprehensive," meaning that the program must bundle measures to maximize energy savings at the site while avoiding the stranding of less cost-effective efficiency opportunities. Similarly, the program must deliver savings from not only lighting, but also refrigeration, HVAC, and controls. SMUD developed a list of "starter" measures for the program, ranging from T8s to LED refrigerator case lighting; from programmable thermostats to duct sealing; and from strip curtains to evaporative fan controllers.
2. *No free lunch*: The program may provide free energy assessment services, but the project itself should require some kind of co-pay. SMB customers that are not yet "sold" on the program concept will be unlikely to pay for an energy audit, and a free energy assessment can be an effective way to get a foot in the door, start the discussion, and demonstrate value for the customer. And clearly, the incentives must be substantial enough to entice cash-strapped businesses to undertake an energy efficiency project. At the same time, SMUD's policy is that there is no free lunch. The customer must have at least *some* "skin in the game," as this helps to ensure customer buy-in and increase perceived value.

3. *Compliance with Codes and Standards:* Because a good portion of the program funding came through the City of Sacramento, and also because the program would potentially be subject to a high level of scrutiny, SMUD decided to require proof of compliance with local codes and standards (i.e. permits were required!) This requirement was to be a source of great difficulty and innovation for our program.

One Stop Shop

In order to make the program “turnkey and hassle free,” SMUD designed the program as a “one-stop shop.” Toward that end, the PA was charged with managing all aspects of the program including:

- program marketing;
- recruiting, vetting, and managing trade contractors;
- conducting energy audits;
- packaging and selling comprehensive energy retrofit projects;
- project design and specifications;
- oversight and inspection of retrofit jobs;
- payment of rebates to the customer; and
- project/program tracking and reporting.

The PA would thus be the first and last touch-point with the customer, and responsible for ensuring a seamless customer experience.

Davis Bacon Act and California Labor Code Requirements

Because the program used Federal funding, this program might have triggered Federal prevailing wage requirements pursuant to the Davis Bacon Act (DBA). The DBA requires that employers pay prevailing wages; submit weekly, certified payrolls; and prepare for periodic job site inspections to ensure compliance. Because SMUD is a public entity, we are also subject to similar laws under the California Labor Code. The DBA and California Labor Code requirements could have added *significant* costs and operational constraints to the program.

The test is that the DBA and California Labor Code apply if public funds are used to *pay for project construction/rehabilitation*. From a program perspective, most utilities would argue that the energy efficiency incentives are just that: incentives for energy savings, NOT payment for project construction. But if you ask your legal department, you will likely find that it’s not that clear cut, and a program will in fact trigger prevailing wage requirements if not structured to clearly separate the utility (and any incentives paid) from the installation process. Undaunted, we engaged the DOE and SMUD’s legal department in a series of “what ifs.” (e.g., What if we designed the program using performance-based incentives paid after the construction was complete and energy savings verified? What if the customer hires the contractor for the work? And what if the customer receives the incentive and not the contractor?) After assessing various program design options, DOE and SMUD’s legal department determined that prevailing wage requirements under DBA and California Labor Code would not apply so long as:

1. the customer selected the contractor (rather than being “assigned” a contractor), and entered into a separate contract with contractor for the work;

2. the incentive payment went to the customer by default, not the contractor; and
3. incentives were strictly based on energy performance (i.e. tied to energy savings, not the cost of construction).

Meeting the first criterion meant that the PA *and their subcontractors* had to stay completely clear of installation work. The significant implication of this requirement was that the program could not be a true direct-install program. The challenge, then, was to create a program that would nevertheless provide a seamless customer experience as the project was handed off to the installation contractor. To meet this business need, the contract required the PA to set up a contractor network, establish and enforce participation guidelines, manage contractor scheduling, and establish a rigorous process for project verification.

The second criterion – that the customer receive the incentive payment – could have been a significant barrier. Contractors are reluctant to take a job if there may be a delay in payment, which could occur if the customer must first receive the incentive before they can pay the balance due to the contractor. On the other hand, requiring full up-front payment from the customer could be a non-starter for many small to medium businesses. The solution was a relatively easy one to address ... we simply gave the customer the option to assign the incentive to the installation contractor. The forms that were presented to the customer included a check-box to assign the incentive payment to the contractor. Without fail, customers chose this option because it reduced their up-front costs.

SMUD's strategy to address the third criterion is addressed in the next section.

Balancing Cost-Effectiveness and Comprehensiveness

SMUD calculates program cost-effectiveness based on dollars spent per Lifetime kWh (LkWh), where the target \$/LkWh for each program is based on the seasonal avoided cost of electricity. There are allowances for programs that exceed the target \$/LkWh, specifically for programs that are new in their approach, programs that focus on a hard-to-reach market like SMB, or that provide other public benefits. However, getting to “comprehensive” and keeping a program cost-effective are two program objectives that can be in direct conflict with one another.

To address program cost-effectiveness, SMUD designed Complete Energy Solutions almost entirely as a performance-based program. In fact, program set-up costs and reporting costs were the only program costs *not* tied to program performance. The PA's performance payment was set at a fixed \$/kWh that covered program marketing, managing trade contractors, conducting energy audits and selling comprehensive projects, project design and specification, project oversight, and rebate processing costs. This insulated SMUD from undue risk, as the PA would only be paid for delivered energy savings.

The comprehensiveness of energy efficiency retrofits is a difficult concept to quantify and/or enforce. This is where SMUD had to get creative. The objective was to keep the program from being dominated by T12-to-T8 conversions, which at the time was still our best-seller under the older program model. Energy efficiency measures were thus divided into two buckets or “tiers,” each with their own targets and incentive levels. Tier 1 was for T12-to-T8 lamp-for-lamp retrofits, and Tier 2 was for everything else (other lighting, refrigeration, and HVAC). Bidders for the PA contract were asked to bid a maximum rebate (\$/LkWh) and performance payment (\$/kWh) for delivering savings in each tier.

The program required that 80% of the program savings come from Tier 2 measures, thus discouraging cream-skimming. In addition, SMUD set a target of 10% of program savings

coming from HVAC measures (a subset of Tier 2). The PA was asked to further divide Tier 2 measures into different buckets based on the cost or complexity of the measure, essentially creating additional tiers.

The advantage of a \$/kWh incentive structure is that higher rebates can be offered for long-life measures such as LEDs. The resulting incentive structure provided a foundation for the PA to sell a comprehensive package to the customer. Installing a low cost, short-lived measure such as a strip curtain would result in a relatively small incentive, but combining this with a longer-life measure such as refrigerator controls would raise the project incentive and the return on investment. The PA need only organize their sales tactics to fully utilize this incentive structure to sell a more comprehensive project to the customer.

In order to address concerns related to DBA/California Labor Code, it was important that we closely tie the customer incentives to actual energy savings (i.e. performance). SMUD's Legal department felt strongly that "performance" needed to be as specific to the project as possible, and questioned the use of generic deemed savings; however, custom calculations or monitoring would have added significant costs to the program. We found a happy medium, which was to base the savings on estimated or actual operating hours specific to each business type. A business with longer operating hours, such as a warehouse, would realize greater kWh savings and would thus receive a higher incentive than a business with fewer operating hours. The California Database for Energy Efficient Resources (DEER) provides deemed savings for measures by building type, based on statewide averages that include operating hours. SMUD settled on DEER as an acceptable method to estimate energy savings for each project.

Finally, incentives were capped at 80% of project cost. Note that these caps were not at the measure level but at the project level, allowing the PA to use measures with a relatively high incentive-to-cost ratio to help balance out more costly measures and/or measures with a longer payback. These project caps oftentimes reduced the incentives paid out, and because rebates were a pass-through line item in the contract, those cost savings were passed on to SMUD.

Compliance with Codes and Standards

The program design requirement that contractors obtain permits was a stumbling block for this program. Willdan initially assumed that contractors were familiar with permitting requirements and were accustomed to pulling permits. In fact, many contractors in SMUD territory knew very little about local code enforcement procedures and rarely pulled a permit for past projects. One contractor flat-out refused to participate in the program because of the requirement to pull permits.

Local government entities were thrilled to have SMUD actively promoting code compliance, but our program exposed inefficiencies with their permitting systems.

The permitting complications generally fell into four categories:

1. Each jurisdiction may have slightly different permitting requirements;
2. Within a given jurisdiction, staff do not always agree on permit requirements;
3. Contractors are often not familiar with permit requirements; and
4. The dollar cost and time-cost of permitting can make some measures too expensive to implement.

One example was the retrofit of T12 linear fluorescent fixtures to T8 fixtures. The measure requires a ballast and lamp change, while the actual fixture remains the same.

Contractors argued that this would be a “maintenance project” and therefore not require a permit. The City held firm, however; breaking a circuit meant that the measure required a permit. The same was true for measures as simple as a wall-mounted occupancy sensor.

The cost of permitting is not insignificant, particularly when considering the contractor’s time. Navigating these waters required help from SMUD’s Local Government Team and the cooperation of local government permitting departments.

First we had to agree upon the permit requirements for each jurisdiction, and then explore ways to streamline the process. Willdan worked closely with SMUD’s Local Government Team and the local building departments to formulate clear and workable procedures, and to educate contractors about the specific requirements of each jurisdiction. Each jurisdiction developed a matrix that clearly laid out which types of measures required permits and which did not. This was an enormous help, as it served to ensure consistency across building department staff (who often have varying interpretations of the code). Second, the building departments agreed to relax certain requirements relating to the submittals. Contractors in good standing were allowed to submit permit applications via fax, and in many cases a hand-drawn diagram was sufficient to illustrate the project. Finally, building inspectors did their best to batch project inspections for each contractor, thereby reducing contractor time waiting around at the job site.

Meanwhile, SMUD also approved a per-project payment of \$60 to compensate contractors for the cost of obtaining permits. Willdan incorporated this and all permitting fees into their sales tool in order to provide the customer with the true project cost.

Pulling it All Together: Program Design and Results

Complete Energy Solutions came together as a full service program that successfully delivered (and continues to deliver) comprehensive energy efficiency retrofits to the SMB market. The program offers lighting, refrigeration, and HVAC improvements, with rebates that cover 50-80% of project cost. The Complete Energy Solutions program (under Willdan) included 118 separate energy efficiency measures.

Figure 1 illustrates the basic process flow for the Complete Energy Solutions Program. Willdan and their subcontractors were responsible for almost all aspects of the program including generating leads, conducting energy audits, selling comprehensive energy efficiency projects, providing specifications, recruiting and certifying local trade contractors, overseeing and inspecting projects, and processing and paying rebates. SMUD provided marketing assistance and program oversight, and the trade contractors worked closely with Willdan to provide a seamless customer experience.

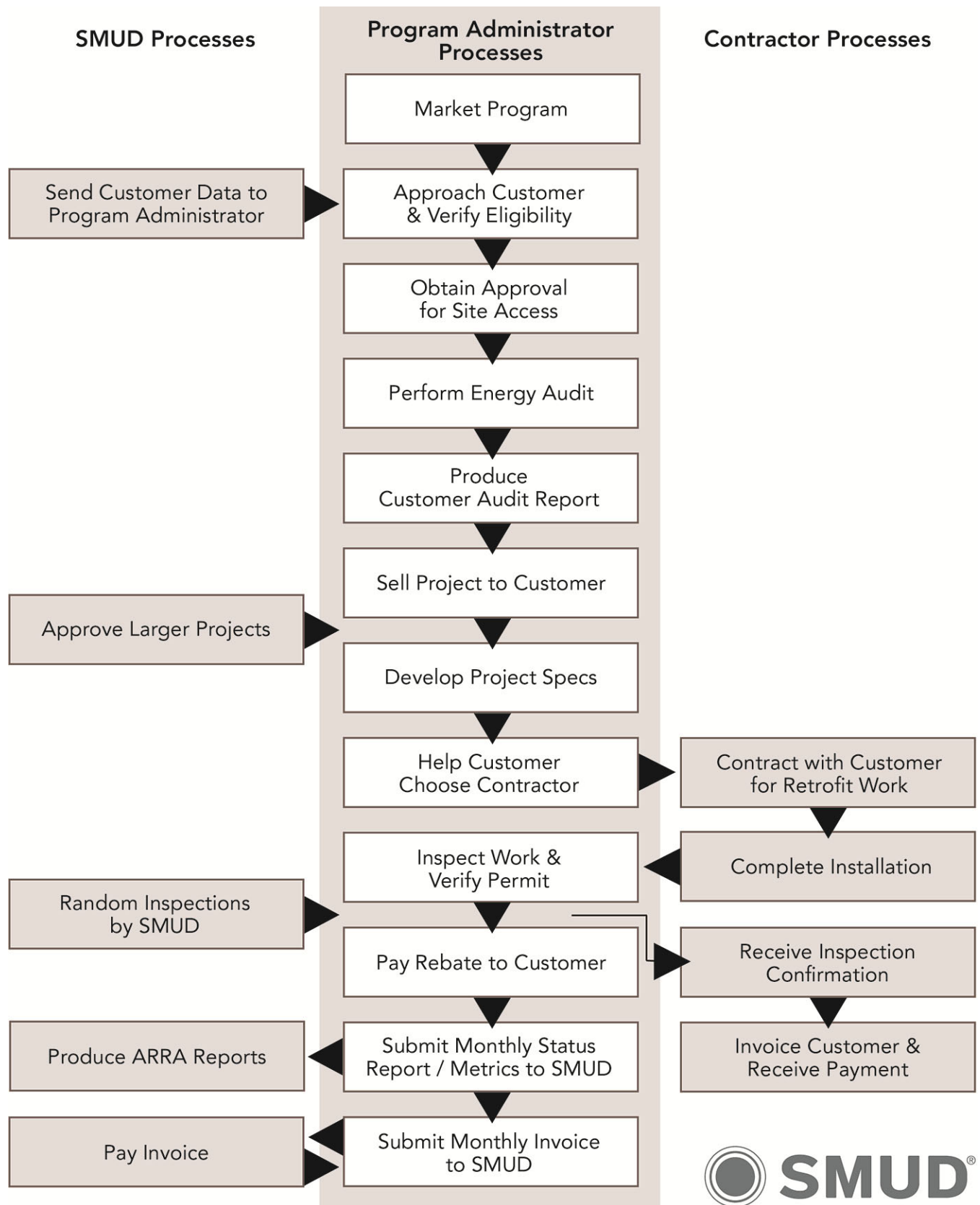


Figure 1. Complete energy solutions program process flow chart.

Marketing

Willdan undertook a variety of marketing approaches, including presentations to local business groups, SMUD co-branded postcards that were mailed out to prospective customers, and street walks. Of these approaches, the most successful marketing strategy was the street walks. SMUD provided customer data that allowed Willdan to strategically target neighborhoods with high concentrations of SMB establishments. A little over half of the businesses approached during these street walks allowed access to conduct an energy assessment. And on average, one out of every four energy assessments resulted in a completed project.

Incentive Structure

As described earlier, the incentive structure was almost entirely tied to program performance. Customer incentives were set at a maximum \$/LkWh depending on the measure type (and the associated tier), and capped at 80% of project cost. The contract allowed for a \$/kWh “contractor performance payment,” which covered Willdan’s costs of marketing, project development, and project management. Planning and setup, tracking, and reporting were the only contract elements not tied to program performance.

Program Results under Willdan Energy Solutions

Complete Energy Solutions proved so successful at addressing the needs of this market that SMUD began to use this program as its first line of defense for SMB customers with high bill complaints, which has become more of an issue as SMUD moves towards revenue-neutral rate design like time-of-use pricing and demand-based infrastructure charges. It was so successful in fact, that within a year of the program launch, the SMUD Board of Directors elected to add *another \$1.7 Million* to the contract, effectively doubling the size of the program.

The following results pertain to the initial two years of the program, with Willdan Energy Solutions as the PA. Table 1 shows the total program budget allocated over the various tasks. Program costs fell in line with SMUD’s targets, with incentives coming in at just over 50% of the total budget.

Table 1. Program cost breakdown

Tasks	Total Cost	Percent of Budget
Planning & Setup	\$162,500	5%
Tracking & Reporting	\$129,700	4%
Customer Incentives	\$1,813,802	54%
Performance Incentive	\$1,239,399	37%
Total	\$3,345,401	100%

Table 2 provides some of the high-level program statistics. In two years, Complete Energy Solutions delivered more than 10 GWh in savings at a cost effectiveness of \$.0374/LkWh, well under our program target of \$.0475/LkWh. Also worth highlighting is that the program is delivering savings with an average measure life of 12 years.

Table 2. Program statistics

Energy Savings (kWh)	10,678,610
kW Savings	1,718
Energy Cost Savings	\$1,388,219
Incentives Paid	\$1,813,802
Average Measure Life	12 Years
Cost Effectiveness	\$.0374/LkWh

The PA completed free energy assessments for 2,346 SMB customers and provided complete projects for just over 600 of these. This reveals a close ratio (ratio of completed projects compared with audits) of more than 25%, a number that is even more impressive considering that participants were required to pay at least 20% of the project cost.

Table 3. Project totals by customer size

Customer Size	Number of Sites
Audits	
0-99kW	2,228
100-299kW	118
Total	2,346
Completed Projects	
0-99kW	589
100-299kW	28
Total	617
Close Ratio	26%

In its first two years, Complete Energy Solutions delivered savings that averaged just over 17,000 kWh per customer at an average total project cost of \$4,000. Rebates on average covered approximately 71% of this cost, bringing the average project payback down to just under two years. In Table 4 below, “customer co-pay” refers to the customer share of the project cost after the SMUD rebate.

Table 4. Project averages by customer size

Average Savings per Site	17,307 kWh
0-99kW	15,825 kWh
100-299kW	48,489 kWh
Average Project Cost (Before Rebate)	\$4,130
0-99kW	\$3,686
100-299kW	\$13,473
Average Rebate	\$2,940
0-99kW	\$2,728
100-299kW	\$7,399
Average Customer Co-Pay	\$1,190
0-99kW	\$958
100-299kW	\$6,074
Rebate as % of Cost	71%
Average Payback	1.84 Years

Finally, Table 5 documents the breakdown of the program savings by measure type. Note that the number one measure was not lighting, but refrigeration. This is in part due to the fact that restaurants and grocery stores made up 52% of the project mix. Lighting measures still accounted for nearly half of the program savings, but only a small percentage of the lighting savings can be attributed to linear fluorescents. LED measures, in fact, make up almost half of the energy savings attributable to lighting. It is also worth noting that Willdan was not able to even come close to meeting SMUD's target of the 10% savings coming from HVAC measures. HVAC measures are a tough nut to crack, and one that we are attempting to address in the next phase of the program.

Table 5. Energy savings by measure type

Measure Type	kWh	% of Program Savings
Refrigeration	5,351,668	50%
Lighting	5,002,870	47%
LED	2,333,499	22%
Linear Fluorescent	1,059,110	10%
Other	835,614	8%
HID	340,790	3%
Signs	195,765	2%
Controls	136,308	1%
Exterior	69,368	1%
CFL	32,417	0%
HVAC	297,044	3%
Total		100%

Complete Energy Solutions Going Forward

After the contract with Willdan expired, SMUD Leadership authorized staff to release a new RFP with a budget of \$3.0 Million per year – almost 10% of SMUD’s entire energy efficiency program budget. This rapid growth in program funding is proof that SMUD sees the program as a valuable component of its energy efficiency portfolio.

SMUD must follow strict contracting guidelines that are designed to remove any bias for working with a specific vendor. While SMUD was pleased with Willdan’s performance under the first contract, they did not win the bid for the second solicitation. SMUD’s new Program Administrator is Ecology Action, a not-for-profit organization with a great deal of experience in the SMB market. Ecology Action has been running the Complete Energy Solutions program now for nearly a year.

The new program targets customers up to 499kW, but is substantially the same program design with a few improvements. In less than a year, Ecology Action has delivered almost 10.6 MWh and is closing better than 45% of all sales opportunities. SMUD and Ecology Action are focusing on expanding the list of measures, reaching new customer segments, and achieving more savings from HVAC measures. Ecology Action has set a target of delivering 20% of program savings from the HVAC category and has just added HVAC replacement to the list of available measures (both early-replacement and replace-on-burnout). To support the 20% target, SMUD is allowing higher incentives to be applied to HVAC replacement measures, particularly for early replacement.

In the future, SMUD would like to make the program even more comprehensive in nature. Toward that end, SMUD envisions integrating other types of measures such as on-site generation, battery storage, and demand response, for a truly integrated customer solution.

Lessons Learned

SMUD learned many lessons from the program pilot that were constructive for the development of the new program. First, it was no surprise that requiring permits added cost and complication to the program, but it helped to build a favorable relationship with local jurisdictions, and we hope that it will encourage contractors to follow local codes outside of the program. From a utility perspective, a possible benefit of requiring permits is that it may enable SMUD to claim additional program savings based on compliance with energy codes. A lesson learned is that it is crucial for the utility to engage with the local permitting department to establish consistent rules and streamlined processes.

Second, utility endorsement was pivotal to the contractor getting their foot in the door. Customers were naturally suspicious of a “free” energy assessment, and many were generally wary of contractors. After discovering this barrier, SMUD provided the PA’s auditors with badges identifying them as a SMUD contractor. Customers were further provided a SMUD phone number that they could call to verify SMUD’s involvement in the program.

Third, DEER was not a good tool for predicting energy savings because it is based on broad statewide averages, and both the load reductions and operating hours can vary widely from project to project. This is particularly problematic during the sales process, as it is important to communicate an accurate representation of potential bill savings. The new Complete Energy Solutions program uses DEER values for measures that are subject to less variability, and a hybrid approach for lighting. The hybrid approach allows for the calculation of lighting savings using DEER values for interactive effects, combined with actual wattage reductions and

operating hours. This hybrid approach is expected to result in more accurate savings estimates for both SMUD and the customer.

SMUD's HVAC savings target of 10% proved to be difficult to achieve. HVAC measures consistently bear out as a tough nut to crack for utility programs; HVAC replacement costs are extremely high, and most customers don't make the investment until the existing unit is inoperative. As described earlier, SMUD is now working closely with the new Program Administrator to test incentives and methodologies that might address this gap.

Finally, it is essential to pay attention to the details that truly make the program "turnkey and hassle free" for the customer. The program must create a seamless and positive customer experience, which requires careful attention to workflow, contractor management, and quality assurance. Energy auditors must have the training and tools available to be able to truly "sell" energy efficiency, and the PA must have the capacity to respond quickly to customer inquiries and complaints.

Conclusions

Delivering a fairly comprehensive program to the SMB market is difficult. Doing so in a cost-effective manner was seen as a tremendous achievement. The PA attributed their success in large part to the innovative program design and incentive structure that simultaneously ensured program cost-effectiveness, motivated the PA to develop comprehensive projects, and offered higher customer incentives for long-life measures. Much of the success can also be attributed to Willdan's persistence in pursuing a more streamlined permit process, their attention to trade ally management and careful quality control, and most importantly, their dedication to providing a seamless "turnkey and hassle free" customer experience.