Scaling Up Fast and Transforming Markets with Regional Energy Networks

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ABSTRACT

California has ambitious policy aims to attain deeper energy savings in buildings in order to achieve its greenhouse gas emissions reduction targets. This paper explores how current energy efficiency program strategies discourage deep retrofits and presents a new program design to overcome the barriers to achieving deeper energy savings in public facilities as part of a new Regional Energy Network (REN). The California Public Utilities Commission made a groundbreaking decision in November 2012 by authorizing the creation of RENs. The intent of these networks is to serve as incubators for innovative new energy efficiency programs. As part of the Southern California REN, the Energy Coalition developed a program designed to help public agencies expedite and drive deeper energy savings through whole building, street lighting, and water and wastewater facility retrofits. Participating agencies receive access to on-call customized and/or turnkey project management, engineering, construction, and financing services delivered through a single, comprehensive effort designed to leverage all utility offerings and maximize impact. The program encourages a collaborative team effort and streamlines services by utilizing cooperatively and competitively bid pools of energy consulting firms, and experienced indefinite quantity contractors. The model is being implemented in the program's vast territory which includes 730 public agency customers, and is both scalable and expandable to a broader geographic region. Since its rollout in September 2013, the program has enrolled 35 public agencies with 108 projects underway and with a goal of delivering nearly 30 million kWh and more than 400,000 therms in annual energy savings.

Introduction

In November 2012, the California Public Utilities Commission (CPUC) made a precedent-setting decision to authorize two Regional Energy Networks that would be independently administered by local governments during the 2013-2014 energy efficiency (EE) funding cycle. One of these RENs, the Southern California Regional Energy Network (The Energy Network), administered by the County of Los Angeles, provides EE services to single family homes, multifamily buildings, commercial buildings and public agencies throughout the Southern California Edison (SCE) and Southern California Gas Company (SoCalGas) combined service territories, an area that encompasses more than 20 million people, 12 counties, 730 public agencies, and 68,000 square miles throughout Southern and Central California. Under contract to Los Angeles County, The Energy Coalition (TEC), a non-profit 501(c)3 organization, designed and implemented a pilot program (Program) to address critical public agency EE gaps and barriers with a comprehensive suite of services delivered through a collaborative approach that also complements and leverages investor-owned utility (IOU) core program offerings. Agencies can opt for either turnkey and/or customized project management, engineering and/or financing services to identify deep energy saving opportunities, develop design performance specifications, secure financing, apply for incentives, and complete EE retrofit projects, all through a single, comprehensive effort that maximizes synergy, efficiency and impact.

California AB 758 authorizes the California Energy Commission (CEC) to develop a comprehensive statewide program to achieve greater energy efficiency in all buildings. The AB 758 Scoping Report estimates that deep energy savings in existing buildings is necessary to meet California's energy and green-house gas (GHG) emissions reduction targets[1]. In response to this challenge, the CEC, the CPUC, and other industry stakeholders are calling for deep energy savings through whole-building EE retrofits.[2] In its Decision 12-05-015, the CPUC not only established the RENs, but also initiated a new era in EE program design by calling for "programs that embrace comprehensive retrofit strategies to be a hallmark of the 2013-2014 energy efficiency portfolios" [3], and specifically called for deep retrofit programs that will achieve deep energy efficiency savings. In its rulemaking to promulgate the AB 758 program, the CEC also similarly emphasized deep energy retrofits: "In the context of California's long term energy savings goals, a whole building approach to energy efficiency is critical." [4] In order to help achieve California's policy goals, The Energy Network's public agency Program aims to:

1. *Increase the number of public facilities retrofitted* – by lowering the barriers to adopting energy efficiency that are encountered by public agencies;
2. *Increase the energy reduction achieved in the facilities served* – by developing projects that deliver whole building retrofits and deeper energy savings; and
3. *Retrofit facilities faster* – by streamlining energy retrofit procedures, providing sustained technical assistance, and reducing the time to construction in half by offering expedited construction services specifically designed for public sector EE retrofits.

If the Program is successful, then more projects will be completed more quickly with greater energy savings, IOU programs will experience greater uptake, and the state will have a new model for organizing the industry to achieve greater collaboration and collective impact. These accelerated and improved outcomes will be critical in mitigating climate change.

Barriers to EE and Whole-Building Retrofits and Current Program Failings

A key question that this paper explores is: *"Can deep savings be achieved through the current energy efficiency program strategies and paradigm?"* Realizing a vision of delivering deeper energy retrofits at scale in California is challenging due to the fragmented way in which the EE industry currently delivers EE services and incentives that results in both market inefficiencies and a "project delivery gap" for the customer. This project delivery gap is especially prevalent in the municipal, universities, schools, and hospitals (MUSH) market[5] - where most of the EE potential remains untapped.[6] [7] The market barriers to whole-building retrofits that lead to this project delivery gap are described below.

1 (CEC, 2012, 14) estimates a 30% energy reduction in 70 to 80% of buildings by 2030 is required.
2 This policy direction by the CEC and the CPUC was in response to the California Energy Efficiency Long-Term Strategic Plan which relies on EE programs to meet California's GHG emissions reduction mandates.
3 (CPUC, 2012, 20)
4 (CEC, 2012, 86)
5 (Chamberlain, Lahr & Nushwat 2008) report that the biggest challenge for local governments engaged in EE projects was "bridging the gap between project development and project implementation/completion."
6 (Larsen , Goldman, 2011) describe a scoping analysis that indicates the remaining EE potential in larger MUSH facilities to be quite large, equal to annual energy savings of 160 million MMBtu.
7 The Program also performed a detailed market and goals analysis that suggests the remaining EE technical potential for the targeted market is equal to annual energy savings over 387.6 million kWh and 5.2 million therms.

Market inefficiencies that discourage whole-building retrofits. Most utility programs target specific equipment or a specific energy end use through a single measure incentive structure or through a direct install type program, thereby driving customers to make incremental EE improvements applying multiple measures within the same facility over time. Such program strategies discourage whole building retrofits. As each technology-specific project skims off the next easiest savings, it "orphans" the remaining capital-intensive, long-payback measures – the target of deep energy savings – which then become more difficult, if not impossible, economically to perform later. IOU programs also tend to direct resources toward only those activities that will contribute toward program goals which results in a piecemeal approach and discourages deeper retrofits. The CEC's AB 758 Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report discusses the challenges of achieving deeper retrofits, reporting that few IOU programs encourage a more comprehensive whole building analysis, and even in these cases they are not being used to develop a comprehensive package of measures and their "market penetration is very low." [8] Rather than vendors and IOU programs visiting a single site multiple times, a better use of program resources and industry expertise would be to address all EE improvements in a single, comprehensive effort to maximize efficiency and impact.

The "project delivery gap" that stymies action by end users. Similar to other nonresidential customers, public agency customers must navigate the available IOU offerings and bring together the appropriate market players required to identify and implement energy retrofits including engineering services and construction services that are uniquely qualified for EE retrofits. Additionally, public agencies face unique barriers that prevent energy retrofit projects in general and deeper retrofits even more so.[9] These can include limited staff capacity, lack of in-house expertise, and lack of project funding. Agencies may also face difficulties in dealing directly with vendors and sales professionals as they may not know what options and which service providers are credible. Finally, public agencies face a myriad of burdensome procurement steps which in most cases include a competitive bidding process. The initial step of managing a competitive Request For Qualifications process to hire energy auditors can take six to nine months and the typical design-bid-build process for construction can easily take another nine to fifteen months. Design-bid-build can also pose serious risks to project quality if the qualifications of the contractor are not adequately taken into account, as well as to project costs if the "low bidder" were to file unjustified change order requests and claims to make up for their low bid. While each of these barriers can potentially be addressed through discrete assistance programs, no single framework has existed to date to bring multiple solutions together for public agency customers within a single, unified project delivery structure.

Energy Performance Contracting (EPC) is the industry's primary vehicle for bundled EE engineering-construction services. However, this approach has its own set of potential barriers and drawbacks for accelerating and scaling up EE projects, including complex contracts that take time and in-house expertise to set up, high transaction costs, lack of transparency and potentially high mark-ups that interfere with performing deep comprehensive retrofits. [10]

[8] (CEC, 2012, 27)
[9] (Vance, Deakin. 1996) and (Chamberlain, Lahr & Nushwat 2008) both describe public sector EE barriers.
[10] (Vance, Deakin. 1996) and (Vance, O'Sullivan, and Kramer, 2010) describe EPC's pros and cons in detail.

A One Stop Resource for Public Agency Energy Efficiency Projects

The Program serves as a "One Stop Resource" that provides a comprehensive menu of services to help agencies implement mechanical, lighting, street lighting, water, and waste water energy retrofit projects that achieve deeper energy savings. Agencies can receive full turnkey services or opt for customized "a la carte" services on a project-by-project basis, thereby only utilizing those services required to complete projects. Program services provided at no cost include project management, benchmarking, audit, design performance specifications, construction management support, and financial analysis. During construction, the agency pays for all construction costs (labor and materials) and must designate a construction manager.

The Program delivers turnkey energy retrofit services, as shown in Figure 1, by joining pre-qualified energy consultants for technical assistance, with competitively bid lighting, street lighting and mechanical contractors for as-needed construction services. The Program structure streamlines and accelerates the project delivery process and enables a collaborative approach that efficiently leverages consultants' energy efficiency expertise with contractors' knowledge of constructability to rapidly and cost-effectively develop and construct energy retrofits. Project Managers oversee an assigned team of engineers that provide turnkey audit, design and construction management-commissioning support services; they also facilitate the use of competitively bid contractors that are on-call to collaborate during design, provide a cost proposal, and construct retrofits immediately after the agency accepts the cost proposal and issues a Purchase Order. The agency also receives financial services to help secure financing.

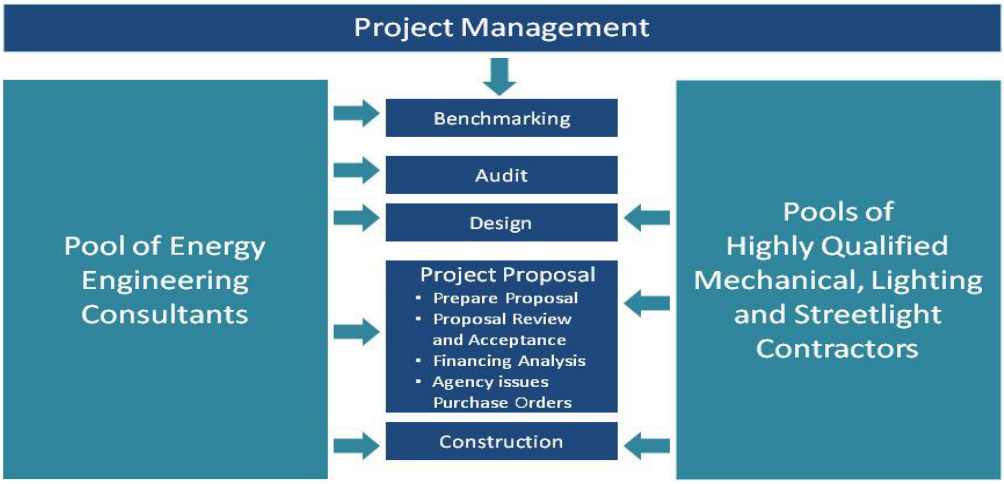

Figure 1. Turnkey project delivery diagram.

Table 1 lists the barriers to energy efficiency and the Program services offered to help overcome those barriers. The "fragmented market" and resulting "project delivery gap" encountered by an agency is addressed by bringing together all of the necessary services into a single project delivery channel for the customer in a way that no existing market player can.[11] Without these critical services, many agencies would likely not engage in the complex task of

[11] For example, project financing is essential, but is not sufficient on its own to create a project; Project managers are often necessary to overcome an agency's staff constraints, but they need a team of engineers and contractors to complete projects; EE engineers are essential to develop deep retrofits, but not sufficient to complete a project; contractors are vital as well, but they do not typically have the energy expertise to evaluate whole building retrofits.

completing deep energy retrofits. Combining the Program's project delivery services with the financing services provides a vehicle for implementing deep retrofits using competitively bid contracts with no up-front capital costs and the option to pay back the project installation and financing costs over time out of the energy and maintenance savings.

Table 1. Barriers to public sector energy efficiency and program services/response

Barrier	Program Services to Overcome Barrier
Fragmented Market / Customer Project Delivery Gap	**Collaboration Across Market Players and One Stop Shop Resource** ▪ Collaboration across market players and use of standardized procedures to transform inefficient, fragmented system for greater collective impact ▪ One Stop Shop Resource that bundles together project management, engineering, financing, and procurement services in one offering ▪ Turnkey energy retrofit services designed for public agencies
Limited Staff Resources to Pursue Energy Efficiency	**Project Management (PM) Services from Start to Finish** ▪ A PM is assigned to each agency to help navigate the EE project delivery process and provide sustained support across multiple EE projects ▪ Facilitates all project activities and the kind of collaborative team effort required to identify, evaluate and implement deeper retrofits ▪ Coordinates with IOUs and other organizations to leverage and integrate all available resources; assists with incentive and on-bill financing applications
Lack of Information on Facility Energy Use and Relative Energy Performance	**Comparative Energy Analysis and Benchmarking** ▪ Provides a portfolio view of energy use and performance across the agency's facilities to help select and prioritize facilities for phased implementation of energy efficiency projects
Lack of In-House Energy Expertise and/or easy access to Engineering Services	**Comprehensive Engineering Services for Deeper Retrofits** ▪ Comprehensive energy audits that identify deeper whole building retrofits ▪ Feasibility and photometric analysis for LED street lighting retrofits ▪ Water/wastewater assessments that combine industry expertise with energy expertise to indentify process optimization and retrofit measures ▪ Design performance specifications that build off of the audit ▪ Construction commissioning and management support services
Lack of Funding for Energy Efficiency Improvements **High First Cost**	**Financial Analysis Services that Integrates Funding from Multiple Sources** ▪ Financial analysis to compare options and develop a financing plan that leverages and integrates all IOU incentives and On-Bill Financing ▪ Project planning services to help utilize internal funding and integrate EE project budget requests into annual Capital Improvement Program ▪ Life cycle cost analysis to encourage a longer-term outlook ▪ Financial tools to encourage deep retrofits that bundle multiple projects into a single financing package structured to pay for themselves
	Energy Project Lease Financing (ELF) ▪ ELF is a product authorized by the CPUC designed specifically for local public agencies to fund energy projects with low transaction costs, low interest rates, no maximum amount, and terms up to 15 years

Public Sector Procurement Challenges	**Expedited and Cooperatively Procured EE Services** ▪ Easy access to free, competitively bid, quality energy engineering services ▪ Competitively bid, on-call construction contractors via Indefinite Quantity Contracts (IQCs) that are transparent and conform to the California Government Code; IQCs address many challenges with design-bid-build including reducing admin burden and the risk of unjustified change orders ▪ Assistance with developing request for bids for a single or multiple agencies

Turnkey Project Delivery a Proven Model at City of San Francisco

The Program's turnkey project delivery model is based upon a successful program implemented by the City of San Francisco's Public Utilities Commission (SFPUC). The SFPUC program utilizes Indefinite Quantity Contracts (IQCs) – otherwise known as Job Order Contracts (JOCs) – that have been adapted specifically for lighting and HVAC EE retrofits. IQC contractors are used in conjunction with energy engineering firms for as needed audit, design and construction management services to deliver comprehensive retrofits.[12] An IQC allows a public agency to construct a series of projects over time, using a competitively bid contract awarded before the projects are identified. IQCs are well suited for EE retrofits since IQCs were originally invented as an alternative to the exhaustive design-bid-build process for repair, replace and maintenance type construction projects – the kind of projects that make up an EE retrofit.

With IQC, contractors bid a mark-up that is applied to a catalog of detailed construction tasks with pre-set unit prices and specifications, referred to as a price book or construction task catalog (CTC). The contractors that meet minimum qualifications and bid the lowest mark-up are awarded the contracts. The CTC includes specifications for each task and is priced locally, with local material, labor and equipment rates. Construction services are delivered on an on-call basis through firm, fixed price task orders based on the pre-set unit prices. Each task order consists of a scope of work, which the contractor translates into a detailed list of repair and construction tasks from the CTC which contains the detailed specifications and pre-set prices.

The SFPUC program design and use of IQCs has made a dramatic difference in the quality, speed, flexibility, and value of EE projects delivered.[13] Since 2009, the SFPUC program has completed over $20 million in comprehensive energy retrofit projects in more than 110 municipal buildings, thereby significantly increasing the throughput of EE projects several times over as compared to utilizing design-bid-build to deliver projects previously. The variety of sizes and types of EE projects that have been completed in a wide range of facilities demonstrates the program model's broad applicability. Deeper energy savings are achieved by combining short and long-payback measures on a facility or multi-facility basis within the same project.

The SFPUC program was held up as a successful model for public agencies in the CEC's Draft AB 758 Action Plan for Comprehensive Energy Efficiency Program for Existing Buildings. The SFPUC Program is listed as one of the five "key initiatives" for the public sector's "voluntary pathways." The plan states that a "similar process could be initiated by other public entities, utilities, regional energy networks, and local governments, and eventually be expanded to contracting processes for small nonresidential buildings."[14]

[12] The SFPUC developed EE lighting and HVAC specific price books with more EE technologies and contracted directly with mechanical and electrical contractors as opposed to using an IQC general contractor and price book.

[13] See (Vance, O'Sullivan and Rao, 2012) and (Vance, O'Sullivan and Kramer, 2010) for a detailed discussion on the advantages of IQCs specifically adapted for completing comprehensive EE retrofits.

[14] See (CEC, June 2013, 50, 54-55)

Expanding to Include Cooperative Procurement and Collaboration at the Regional Level

The Program expands upon the success in San Francisco to a regional setting with a number of important enhancements, including: 1) expanding the scope to include street lighting and water/wastewater treatment plant projects; 2) utilizing cooperative procurement solutions to serve multiple agencies; 3) adding hundreds of advanced technologies to the CTC price books; 4) expanding the level of standardization of procedures, tools, and templates; and 5) expanding collaboration and partnership to the regional level.

Cooperative procurement solutions offer resource-challenged agencies a viable alternative to conventional, independent procurement processes to gain efficiencies and cost savings by aggregating volume, securing best pricing, and reducing administrative overhead. To leverage these benefits, the Program established cooperatively procured *as-needed* turnkey EE retrofit services for use by multiple agencies in the region. Program staff first performed a competitive Request for Qualifications to evaluate the capabilities of energy consulting firms and establish a pool of sixteen qualified firms to provide comprehensive technical support on lighting, mechanical, street lighting and water/waste water projects.

Program staff worked in partnership with the National Joint Powers Alliance (NJPA) to establish the as-needed construction services. NJPA is a national service cooperative serving as a contracting agency for government and education agencies across the country. The NJPA and The Gordian Group (program contractor for the NJPA's ezIQC - an easy indefinite quantity construction program) have established general construction IQC contracts in various regions in the U.S. For the first time and unique to this Program, the NJPA expanded and modified the ezIQC program to establish competitively bid *EE specialty lighting and HVAC IQC contracts*, and to update the Lighting and Mechanical CTCs that were used for the SFPUC program with hundreds of new advanced technologies including those eligible for SCE and SoCalGas incentives. The CTCs were updated with local pricing and established at the county level. NJPA awarded fourteen lighting, street lighting and mechanical contractors with IQC contracts across twelve counties to perform on-call EE retrofits as part of Program's suite of services. In addition to overcoming procurement barriers, the advantages of cooperative procurement include:

- Providing more efficient delivery of products and services;
- Obtaining the best value for technologies and services through competition;
- Efficiently connecting multiple EE service providers with multiple customers through fair and equitable competitive contracting opportunities; and
- Increasing public confidence through ethical and transparent procurement practices.

Standardized Procedures, Tools, Best Practices and Templates

Another key element of the Program is the *Project Delivery Manual* which describes the Turnkey Project Delivery Process depicted in Figure 2 and contains more than 500 pages of detailed instructions for Project Managers and the consulting firms delivering technical assistance to Program participants. The Manual contains detailed procedures, audit spreadsheets, and templates for deliverables at every phase of each project type. The intent of providing this level of standardization for performing deeper retrofits throughout the entire process is to create efficiencies, streamline project delivery, minimize errors, expedite incentive processing, and achieve consistency in deliverables, engineering methods and results across multiple teams of project managers, consultants and contractors. Another important tool being utilized for Program

tracking, reporting and quality assurance is a Salesforce driven *Customer Relationship Manager (CRM) tool*. The CRM serves as the Program database for managing agency contact and project information throughout all project phases from initial outreach and enrollment, project development, implementation and close out; it is used to organize, store, and summarize project data in a single location for Program evaluation and reporting purposes. The CRM is a powerful and robust database tool that can help support scaling up project delivery across an entire region.

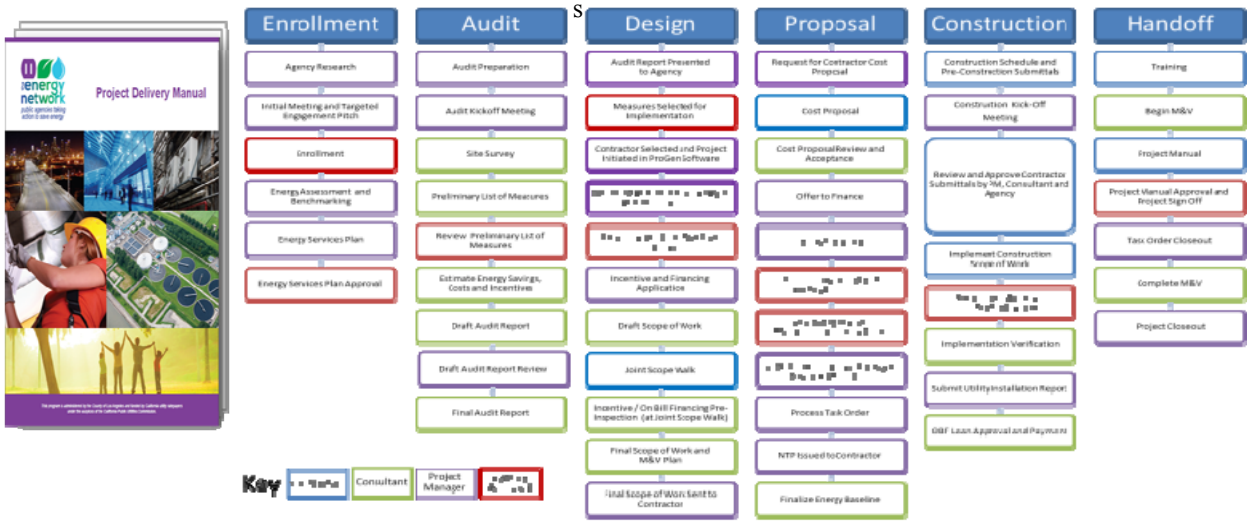

Figure 2. Project Delivery Manual and turnkey project delivery process

Results (as of May 2014)

The adopted 2013-2014 goal for the Program is to achieve 29,675,000 kWh and 400,409 therms in annual energy savings. Since its launch in mid-September 2013, 35 agencies have been enrolled and 108 projects across 137 facilities have been initiated for an aggregate estimated 35.8 Million kWh of electric savings and 208,000 therms of gas savings associated with projects within the pipeline. Table 2 shows the distribution of enrolled agencies and projects. Figure 3 shows the distribution of electric savings across the project types including lighting, mechanical, street lighting and water/wastewater pumping and process optimization projects.

Table 2. Enrolled agencies and active projects

Agency Type	Number	Project Type	Number
Cities/JPAs	26	Mechanical	46
Counties	2	Lighting	42
School Districts	2	Street Lighting	11
Water Agencies	4	Pumping Project	3
Waste Water Agencies	1	Process Optimization	6
Total Enrolled	**35**	**Total Active Projects**	**108**

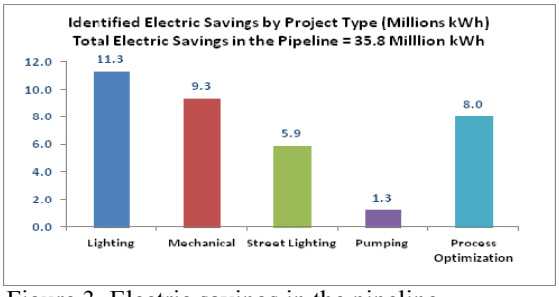

Figure 3. Electric savings in the pipeline.

Out of the 108 projects in the pipeline, more than half (54%) are receiving the turnkey services including use of the NJPA contractors with the remaining 48 projects receiving customized services. Additional projects are being initiated in order to increase the likelihood of

the Program meeting the adopted goals. Three project examples are presented below to demonstrate the different advantages of the Program's EE project delivery approach including:

- Project Example #1 – ***Deeper Retrofits***: City of Pomona
- Project Example #2 – ***Speed***: Culver City Wateska Parking Structure Lighting project
- Project Example #3 – ***Collaboration***: City of Barstow Wastewater Treatment Plant.

Project Example #1 – Deeper Retrofits: City of Pomona

Scope. Short-payback and long-payback measures across multiple sites were combined for deeper savings. EE measures include: LED replacement of HID streetlights; LED replacement of metal halide fixtures; T8 fixtures retrofitted with High lumen lamps and dimmable ballasts along with a wireless lighting controls system with scheduling, daylight harvesting, occupancy sensing, and demand response capability. City Hall measures include two high efficiency Turbocor compressor chillers; upgraded Energy Management System (EMS) with optimized Variable Air Volume (VAV) controls; variable frequency drives (VFD); chilled water reset; cooling tower VFD; and reduced condenser water temperate set point.

Services. The agency is utilizing the full suite of turnkey services with NJPA contractors scheduled to start construction in Summer 2014.

Figure 4. ELF Financing Fact Sheet

Approach. A comprehensive financing package was developed (see excerpts below in Table 3) that includes a life cycle cost analysis and leverages IOU incentives, On-Bill Financing, and internal funds, with the remaining required investment financed through the Program's Energy Project Lease Financing (ELF) services. The ELF fact sheet is shown in Figure 4. This comprehensive approach will allow the City to implement the full package of measures indentified within the Library, City Hall, and two city pools. The City will be able to reduce the Heating, Ventilating, and Air Conditioning (HVAC) energy end use at their highest energy using site, City Hall, by more than 41% while implementing a desperately needed capital intensive chiller plant and EMS system upgrade. The lighting energy end use at City Hall will be reduced by approximately 34% through advanced lighting technologies and controls.

Table 3. City of Pomona package of street lighting, lighting and mechanical projects

Project Type	Electric Savings (kWh/yr)	Gas Savings (therms/yr)	Total Energy Cost Savings ($/yr)	Agency Project Cost ($)	Total IOU Incentives ($)	Agency Net Project Costs ($)	Simple Payback (years)
Street Lighting	1,152,871	-	$ 80,700	$ 1,299,314	$152,079	$1,147,235	14.2
Lighting	119,866	-	$ 17,359	$ 219,309	$19,442	$199,867	11.5
Mechanical	324,923	3,570	$ 84,889	$ 1,062,405	$44,756	$1,017,649	12.0
Total - All Projects	**1,597,660**	**3,570**	**$ 182,948**	**$2,581,028**	**$216,277**	**$2,364,751**	**12.9**

Net Present Value Without Financing (NPV)	Net Present Value With Financing (NPV)	Savings-to-Investment Ratio	Return on Investment (ROI)	Simple Payback * (years)
$ 622,697	$1,352,844	0.50	11%	9.4
Assumptions: Discount Rate = 5.00%; Project Lease Interest Rate = 5.00%; Utility Escalation Rate = 4.00%; Inflation Rate = 2.00%; * Simple Payback includes maintenance Savings = 2% of project costs.				

Funding Source	Amount
Agency Cash or Grants	$56,249
On Bill Financed Amount	$1,311,857
EPL Financed Amount	$996,645
Total Net Project Cost	**$2,364,751**

Project Example #2 – Speed: Culver City Wateska Parking Structure Lighting Project

Situation. Culver City identified U.S. Department of Energy funding for the project, but was faced with a fast-approaching deadline to spend it. This called for a quick project turnaround.

Scope/services. Replaced 151 x 150W high pressure sodium fixtures to new 80W induction fixtures. Turnkey services were provided at no cost including audit, design, and construction management support; the City paid for construction performed by a NJPA lighting contractor.

Results. Audit kick-off to construction completed in 7.5 weeks. (See Figure 5 for illustration of expedited construction services). The facility's energy use was reduced by 56 percent, saving 126,034 kWh and $17,512 annually. Additionally, the longer-life induction lighting will save the city approximately an additional $1,464 annually from reduced maintenance and material costs.

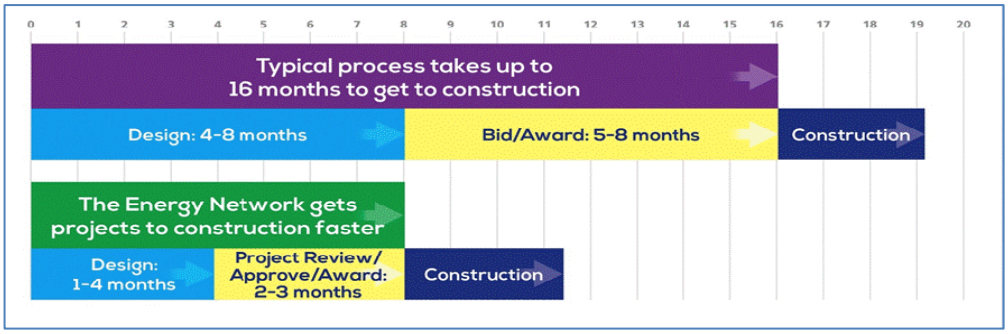

Figure 5. Expedited construction services reduce time to construction

Project Example #3 – Collaboration: City of Barstow Wastewater Treatment Plant Collaboration

The Program convened leading water system and treatment optimization experts with EE experts experienced in water/wastewater projects to collaborate on new solutions that go beyond the measures typically targeted by IOU programs (such as pump retrofits, variable frequency drives, motor right-sizing, and blower optimization) to include Process Optimization Measures (POMs) for deeper energy savings. POMs aim to match the energy use to the exact demand of treatment using reliable and innovative technologies and practices (i.e., optimizing the fluid flow system or discontinuing use of pumps, digesters or other system components). Identifying POMs requires both water/wastewater and EE experts to assess alternative operating scenarios and perform energy audits at the level of rigor required to qualify for IOU incentives.

Partnership. The Program has partnered with San Diego State University's Industrial Assessment Center (IAC) to provide investment grade audits at several water and wastewater treatment facilities funded by the Department of Energy. The Program also draws on expertise from IOU third party implemented programs serving water and wastewater facilities.

City of Barstow: The Program's team of experts will integrate the measures identified from an IAC audit with POMs into a comprehensive proposal for evaluation by the agency and move the selected measures forward through design and construction by a NJPA contractor. The City plans to fund the project as part of an approved capital project to rehabilitate the facility.

How Program Model Can Help Scale Up EE and Transform the Market

The Program is ultimately a regional market transformation initiative whose primary goal is to change the way the market players come together to provide services to customers in ways that create efficiencies and cost savings for both, leverage IOU offerings to their maximum and accelerate and scale up EE by:

1) ***Effectively addressing the barriers to EE retrofits.*** Agencies receive on-call customized and/or turnkey services designed to help them achieve deeper energy savings.
2) ***Applying a turnkey project delivery model with the demonstrated capacity to dramatically increase the ease, speed and throughput of completed EE projects.*** Similar to the SFPUC, the United State Postal Service (USPS) developed a program that combines IQCs with EE engineering services to scale up EE. Ken Downes, USPS Program Manager, credits the use of IQCs in combination with EE engineers for being able to complete over $1.7 billion in energy retrofits with very limited staff saving an estimated $188 Million annually.[15]
3) ***Expanding this turnkey model to the regional setting through the use of cooperatively procured contracts to serve multiple agencies***. Cooperatively procuring the engineering and construction services that are required for deeper retrofits for use by multiple agencies eliminates the inherent inefficiencies of each agency procuring these services separately.
4) ***Creating opportunities for greater collaboration and innovation at the project team level, at the program level, and at the regional scale.*** The level of collaboration supported by the Program structure enables the Program to more quickly adapt to a rapidly changing policy environment as well as advances in EE technologies and methods for greater impact.

The Program is easily scalable by adding more EE firms and contractors to the pools; it is replicable by establishing similar cooperatively bid services at the regional level in other areas. Future work could include investigating how to aggregate disparate projects across multiple agencies into large portfolios that then attract and are matched to large investors with the end result of accelerating greater levels of EE investment. One way to leverage and sustain large EE investments at the Program level would be to establish a revolving fund that uses ratepayer dollars as seed money and then transitions into a self-sustaining funding model once economies of scale are reached. Under this scenario, the costs for the technical and project management services could be recovered through various mechanisms, such as a fee added to the final

15 The USPS used IQCs combined with engineering services to achieve a 30% reduction goal. (Downes, 2013)

construction budget. The Program could theoretically also offer a credible savings guarantee, perhaps in conjunction with on-bill repayment (OBR), to provide greater security to banks and investors against loan defaults. To be successful in this regard, the major risks associated with EE project performance must be assessed and strategies developed for mitigating these risks. The Program model already addresses many of the key risk factors that determine a project's success, such as setting minimum qualification standards for the engineering consultants and contractors through the RFP selection process, and establishing best practices, procedures and quality controls throughout the entire project delivery process. Ideally, a structure could also be established to aggregate and spread the project performance risk on an overall Program or portfolio-wide level with greater economies of scale and with full transparency for the benefit of all participants. This regional portfolio approach may provide risk management advantages over the typical EPC model with its one-to-one contractual relationship with customers.

Finally, centralizing the delivery of EE services through a regional program could potentially support more effective and sustained EE workforce development solutions by creating a steady pipeline of projects for participating contractors and consulting firms across an entire region. This could make it easier to employ apprentices and engineering staff and plan for career pathways within the various trades and technical/engineering professions; it may also provide greater opportunities to shepherd smaller contractors or energy firms into the Program thereby creating more supportive conditions for their success beyond training alone.

Conclusion

Recent state policy describes ambitious aims to attain deeper energy savings in buildings. The Program provides a construct to overcome gaps and barriers in implementing EE retrofit projects through a comprehensive design that is both scalable and replicable. Resource-challenged public agencies can access turnkey project management, engineering, competitive construction, and financing through a single "one stop" resource that helps to expedite and drive deep EE retrofits for aging facilities. Programs that capitalize the expertise of the entire industry for greater collective impact will be necessary to attain the State's GHG emission reduction goals. By achieving deeper energy reductions, increasing the percentage of buildings retrofitted and completing projects faster and at a scale in accordance with what is at stake, the Program offers a viable solution and improved outcomes that can benefit all stakeholders.

References

California Energy Commission, CA Draft Action Plan for the Comprehensive Energy Efficiency Program for Existing Buildings, June 2013: 50, 54-55.

Downes, Ken, "Project Delivery Breakthroughs for Improving Energy Efficiency." Presentation at 2013 National Association of State Facilities Administrators Conference.

California Energy Commission, Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report, August 2012

Decision Providing Guidance on 2013-2014 Energy Efficiency Portfolios and 2012 Marketing, Education, and Outreach, D.12-05-015, May 2012

Satchwell, Andrew, Larsen, Peter, and Goldman, Charles. 2011. Combining Energy Efficiency Building Retrofits and Onsite Generation: An Emerging Business Model from the ESCO Industry. ACEEE Summer Study on Energy Efficiency in Industry.

Vance, Christine, O'Sullivan, Terry and Rao, Abhijit. 2012. Picking Up the Pace with San Francisco's EECBG Building Retrofit Program: How to Retrofit Buildings at Lightning Speed while Stretching Funding. ACEEE Summer Study on Energy Efficiency in Buildings.

Vance, Christine, O'Sullivan, Terry and Kramer, Leslie. 2010. Striking While the Climate is Hot: New Program Design for Accelerated Delivery of Energy Retrofit Projects. ACEEE Summer Study on Energy Efficiency in Buildings.

Chamberlain, Bruce, Lahr, Gerald and Nushwat, Marvin. 2008. Leading by Example: Streamlining EE in the Local Government Sector. ACEEE Summer Study on Energy Efficiency in Buildings.

Vance, Christine, Deakin, John. 1996. "Picking up the Pace: an Evaluation of Energy Delivery Options and Financing Options", Urban Consortium Energy Task Force/Public Technology Incorporated. Chicago, Ill.