

Sustainable Communities Program: Increasing Savings by Targeting Energy Efficiency and Sustainable Design

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ABSTRACT

Southern California Edison (SCE) launched the Sustainable Communities Program (SCP) in 2006 as a pilot program to encourage inclusion of sustainable design practices and electricity-saving features in large buildings, mixed-use complexes, multi-building developments and planned communities.

Going beyond programs that focus primarily on specific energy-efficient equipment or single buildings, the SCP broadly targets community-based forms of development and encourages a new generation of utility programs. With this approach, the utility can achieve maximum impacts by being involved in projects as early as the conceptual design phase. In addition to the traditional energy measures of current demand side management (DSM) programs, the program addresses energy savings related to water efficiency and other nontraditional measures at the local and regional scale.

New construction projects normally face significant barriers such as a lagging economy, limited budgets, and limited experience with energy efficiency and sustainable design. The program addresses these barriers by lowering participants' first costs through technical assistance and incentives, minimizing information or search costs, and reducing the real or perceived risks associated with implementing sustainable design practices. Accepted projects are also achieving green building certifications and represent the cutting edge of development.

This paper outlines the program approach, highlights the projects SCE selected to provide good test cases, and provides lessons learned. Lessons learned include the need to integrate utility program delivery and the need to address developer sales cycles of four years or longer. The pilot has been successful and SCE anticipates a full-scale roll-out in the next funding cycle.

Introduction

Southern California Edison (SCE) launched the innovative Sustainable Communities Program (SCP)¹ as a pilot to encourage the inclusion of sustainable and electricity-saving features in large non-residential new construction projects. The pilot began in 2006, runs through June 2009, and is funded through the California Public Utilities Commission Public Goods Charge. SCE anticipates a full-scale role out in the 2009-2011 program cycle. KEMA Services Inc. is the implementation contractor hired by SCE to implement the program, while Enovity and WorldBuild serve as subcontractors.²

¹ Sustainable Communities Program: www.sce-scp.com

² Kema: www.kemagreen.com; Enovity: www.enovity.com; Worldbuild: www.worldbuild.com.

This paper is organized as follows:

- Introduction
- Program background and scope
- Methodology
 - Identify market barriers
 - Program value proposition
- Results
 - Select project profiles
 - Lessons learned
- Conclusion

Program Background and Scope

The program is designed to support the construction of buildings that will meet future higher efficiency standards by seeking to expand the traditional focus of utility programs from energy efficiency in individual buildings to projects at the scale of an entire development. As well, the program sought to address commercial construction practices that affect occupant health and environmental well-being. This includes energy use as well as nontraditional sources of energy savings such as water efficiency. In that sense the program is focused on two dimensions: the vertical dimension of traditional building-by-building efficiency, and the horizontal dimension of community design where multiple buildings are affected.

By becoming involved much earlier in the design phase, the program seeks to achieve greater impacts in energy efficiency through building massing and orientation, as well as promote sustainable design and construction practices that broaden the offerings beyond traditional demand side management. The program is also significant in that it targets a wide array of building project types that have not been fully addressed in past programs, especially mixed-use or multi-building projects, and master-planned communities.

In addition to the building shell, HVAC, and lighting and controls, the program addresses water efficiency and nontraditional energy-saving measures previously unaddressed at the development scale. As a pilot, the utility selected 20 innovative projects that offer diversity in design interest, occupancy type, geography, project complexity and innovative sustainability measures. Generally, accepted projects:

- Commit to energy efficiency and energy usage reduction goals that are at least 20 percent better than the 2005 Title 24 Energy Standards for commercial developments or 15 percent better for single family or multifamily developments
- Achieve a Leadership in Energy and Environmental Design (LEED[®]), Silver rating,³ GreenPoint Rated,⁴ or equivalent level of green building practices, as is appropriate for project type.

³ The LEED Green Building Rating System, administered by the U.S. Green Building Council (USGBC), seeks to address the complete lifecycle of buildings. There are a variety of LEED systems, such as for New Commercial (NC), Neighborhood Development (ND) and Existing Buildings (EB), to address different project types. LEED-NC is the system of choice for commercial project teams in the program's experience. <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>, accessed 16 May 2008.

Most participating projects contain a diversity of functions, either at the scale of the building (mixed-use) or at the scale of a particular development in the mixture of building types. Accepted project types include:

- Mixed use buildings – retail or commercial and residential
- Transit-oriented developments
- Large multi-building family residential complexes
- Planned communities including retail, commercial and residential components
- Large multi-building commercial developments – office campuses or retail parks and planned developments.

Green Building Certification

All projects accepted into the program are expected to incorporate sustainable design principles in addition to agreeing to meet aggressive energy efficiency goals. The majority of projects going through program are seeking LEED-NC certification. While all LEED projects are required to meet certain prerequisites, LEED-NC has four levels of certification depending on the number of points achieved: Certified (lowest), Silver, Gold, and Platinum (highest). The LEED-NC system is organized into five major categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; and Indoor Environmental Quality.

Sustainable Design

The most effective strategy for managing costs while maximizing efficiency is to use an integrated design approach that addresses energy efficiency in the context of broader sustainability principles. A recent major study found no significant difference in average costs for green buildings. (Matthiessen & Morris 2007) Pursuing a compartmentalized approach can lead to higher overall costs than using an integrated approach from the outset. (Kats et al. 2003) From the utility's perspective, the marketing power of green buildings is the best way to encourage energy efficient new construction.

Tracking Nontraditional Savings

The program also seeks to evaluate and substantiate, when applicable, nontraditional electric energy savings not currently being tracked at a program level. For each project, the staff calculates electricity demand (kilowatts, kW), electricity consumption (kilowatt-hours, kWh), and natural gas (therm) savings, but also will calculate nontraditional savings, where possible, to substantiate and support the validity of nontraditional sources of energy savings such as water, electrical infrastructure, transportation, land use, building materials and/or emission reductions..

⁴ The GreenPoint Rated System was first developed by the Alameda County (California) Waste Management Authority (www.Stopwaste.org) as Green Building Guidelines and is now managed by Build It Green. This rating system is tailored to the climates and energy standards found in California and is for residential projects. www.builditgreen.org/greenpointrated.

⁸ Working Artists Ventura: www.placeonline.us/projects/overview.html

Integration with Other Programs

This program is designed to complement SCE's offerings serving new construction projects, and where available, with the programs offered by other utilities such as water agencies. Participating projects are usually eligible for additional technical assistance and/or financial incentives through SCE programs, such as:

- Savings By Design (non-residential new construction)
- Self Generation Incentive Program (distributed generation)
- California New Homes (residential new construction)
- Electric Transportation (electric vehicles, plug-in hybrids)
- California Solar Initiative (photovoltaics on new or existing commercial buildings)
- Edison Smart Connect (advanced meters)
- New Solar Home Partnership (photovoltaics on new residential buildings).

Methodology: Identify Market Barriers

New construction projects face significant barriers such as a lagging economy, a focus on minimizing up-front capital costs in construction projects, and a lack of experience with energy efficiency and sustainable design implementation processes. This program is a direct response to the growing interest in designing facilities and communities with sustainable design practices.

The construction industry is challenged in responding to the call for healthier buildings, conservation of resources, and greater energy efficiency. Also, the California Public Utilities Commission's (CPUC) decision ordering the development of a statewide strategic energy efficiency plan called out several Big Bold Energy Efficiency initiatives and associated milestones. Three are specifically relevant to the program:

- 100 percent of the non-residential new construction market will be net-zero by 2030
- 100 percent of the residential new construction market will be net-zero by 2020
- 50 percent of the residential new construction market will be 35% better than 2005 code by 2011.

In addition to the CPUC decision, is the adoption of AB32 (Global Warming Solutions Act) and the objectives in the Governor's Green Building Executive Order S-20-04, which requires builders on state projects to add "green" measures and practices to reduce the carbon footprint of commercial and residential new construction.

The program lowers the participant's first costs through technical assistance and incentives, minimizing information or search costs, and reducing the real or perceived risks associated with implementing green building and energy efficiency practices. The program specifically addresses the following key market barriers.

- **Higher expenses.** The financial incentive offered to projects is performance-based, giving owner's a financial reason to pursue higher levels of efficiency. For projects pursuing LEED, the program reimburses half of the certification fees. By buying down first costs (both real and contingency-based), the utility improves the return on investment of energy efficiency and sustainability measures.

In addition to direct financial incentives, the program provides soft cost incentives in the form technical assistance and assistance in design team integration, reducing costs that otherwise incurred by the project owner.

Additional soft cost incentives include the benefits of reduced operating costs to manage rising energy costs and improve bottom-line performance. The program provides economic analyses to show developers/owners the increased property value, decreased maintenance costs, and potentially decreased liabilities associated with building green.

- **Lack of consumer information.** Sustainable development is an emerging discipline with its own rules, terminology, and modes of analysis. Technical assistance assists motivated design teams in coming up to speed in this area. Information on policies, rebates, building strategies, team selection, and product resources are also provided through project consultations or more general trainings.
- **Risk aversion.** The owner's primary concern is avoiding construction delays that impact the bottom line. The cost of new approaches, including commissioning, high performance modeling, measurement and verification, and innovative technologies must also include a contingency for schedule disruptions. The program provides support in the form of fact sheets, case studies, and examples from experienced program staff to boost the confidence of project teams new to sustainable design.
- **Regulatory barriers.** Existing building codes, infrastructure requirements, or permitting processes can create barriers to success. The program provides training and project consultations to practitioners and regulating bodies. In addition, program staff can research local code language that specifically allows relevant technologies, enlist practitioners who have overcome barriers previously to strategize methods, and obtain quotes from progressive code officials to address specific barriers facing participating projects.
- **Local government barriers.** The program provides training opportunities for members of municipal project teams. Targeted training may include green building program development, local ordinances, stakeholder workshops, and options for municipal incentive programs, such as accelerated permitting. The standard program financial incentives and technical assistance reduce the burden on already strained capital budgets for municipal green building projects.

Methodology: Program Value Proposition

One of the signal features of the program is early involvement. This maximizes the potential for savings due to site planning decisions typically already made by the time the utility is brought into the project. While early involvement is clearly in the interest of the utility, why should the customer's allow the utility to interfere?

The program must add value, whether it be helping the owner identify the green building goals of the project, offering financial incentives, or soft cost incentives in the form of design team assistance.

For all projects, the program acts as a utility program clearinghouse, coordinating with other available offerings to make sure the project maximizes its incentive potential, avoids participant confusion, and maximizes energy performance across the demand side management spectrum. In addition, with the value placed on adhering to construction schedules, having a utility advocate on the “inside” to act as liaison between the utility’s non-DSM departments and the project is something of significant value to most owners.

From the utility’s perspective, areas of consideration with an impact on energy demand include: project planning, siting, building orientation, building massing and clustering, energy efficiency, heat-island effects, water efficiency, on-site power generation, electric transportation infrastructure, commissioning, and maintenance planning.

Table 1 summarizes the menu of services available to projects accepted into the program, several of which are described below in greater detail.

Table 1. Sustainable Communities Program: Technical Assistance Services Available

Service	Project Phase		
	Conceptual/ Schematic Design	Design Development/ Construction Documents	Construction
Provided to All Projects			
Program Liaison	◆	◆	◆
Measure Follow Up			◆
Incentive Identification	◆		◆
Customized Services Available			
Policy Development Assistance	◆		
Team Formation	◆		
Eco-Charrettes	◆		
Design Assistance & Project Reviews	◆	◆	
LEED® Documentation Assistance	◆	◆	◆
Commissioning Support	◆	◆	◆
Other Customized Assistance	◆	◆	◆

- **Policy development assistance.** Support project owners and municipalities in the development of green building policies.
- **Team formation.** Assist project owner with the development of request for proposal (RFP) language, and review qualifications for the selection of design team members.
- **Eco-charrettes.** Facilitate and develop agendas for integrated design workshops (the charrette) to identify the project’s green building goals and brainstorm potential green building measures. Attend workshop as subject matter expert.

- **Design assistance.** All of the following are available depending on need: general team education, plan and specification review, energy efficiency and sustainable design recommendations, energy modeling support, green feature cost assessment, and assistance with measurement and verification plans.
- **Commissioning support.** May include: advice on managing a commissioning project, assistance in preparing the Owner's Project Requirements, sample RFP language, and design peer reviews.

Results: Select Project Profiles

The following section provides an overview of selected participating projects. As of May 2008, most of the participating projects are still in conceptual design or design development, and so the energy savings results are still only provisional. For each project, the program is helping to set energy efficiency and resource efficiency targets, working to ensure design goals are met and that identified measures survive the value engineering process.

Working Artists Ventura

The Working Artists Ventura (WAV) Project⁸ has as its goal to be the first LEED-certified artist community in the nation. It will be the first LEED-certified project in the City of Ventura. The \$57 million, state-of-the-art, mixed-use community is designed for artists and creative businesses. Located in the cultural district of downtown Ventura, California, WAV will offer affordable living and working space for over 100 artists.

The project includes a combination theater and gallery for performances, art openings and public gatherings. Arts-friendly small businesses, including coffee houses, galleries, and jazz clubs, will draw foot traffic and contribute to the vitality of the neighborhood. Sixty-nine new units of affordable housing will provide homes and crucial services to those at the lowest end of the income scale, including youth matriculating from the foster care system. Fifteen of the units will be designed to provide permanent supportive housing intended to house recently homeless families and individuals from across Ventura County. Thirteen market-rate condominiums with ocean views will bring higher-income households to the community and help to subsidize the affordable housing.

With the community involved in every phase of development, the WAV project is being created for diverse, mixed-income families and individuals. The WAV Project is being developed by the nonprofit Projects Linking Art, Community and Environment (PLACE). PLACE has implemented a Green Manufacturing Partnership Program, which seeks to partner with leading manufacturers of green products that are willing to donate materials to the project. The program has provided comprehensive design and specification reviews that address energy and water efficiency, indoor air quality, renewables, landscaping, and other issues. Staff also provided linkages to other utility and state programs, nonprofit resources, and in general provided assistance to a highly motivated team with limited experience in integrated design, or energy efficiency.

Orange County Great Park

The Orange County Great Park⁹ is part of the redevelopment of the decommissioned El Toro Marine Corps Air Station and will provide a wide array of active and passive uses, including a 2.5-mile canyon and lake, miles of walking and biking trails, a cultural terrace, Orange County's largest sports park, a botanical garden, and other recreation amenities. More than 3,885 of the 4,700 acres will be dedicated to open space, education, and other public uses.

The City of Irvine envisions cutting-edge technologies that will make the park sustainable and will include a “living laboratory” to demonstrate eco-friendly design and construction techniques.

In addition to aggressive energy and water efficiency goals, the design team seeks to reuse the existing materials whenever feasible, believing the former base has existing resources that are far too beautiful to overlook. They plan to build bridges with the redwood lumber from military hangars and recycle the concrete runways to build the veterans memorial and roadways. The utility is helping the design team evaluate a variety of innovative solutions including solar LED trail lighting, a hydrogen fuel cell demonstration project, and a zero-emission shuttle system. The program has assisted with energy efficiency goal setting, green scoping meetings, and feasibility studies for on-site generation.

El Monte Transit Village

The El Monte Transit Village¹⁰ is a redeveloped town center in the San Gabriel Valley, encompassing a 65-acre site, including retail stores, dining and entertainment venues, office space, 1,850 residential units, a regional education center, a childcare center, a movie theater, a hotel, and a conference center. The Village is designed around the El Monte Train Station and the El Monte Bus Transit Station, itself the busiest metropolitan bus station west of Chicago.

The project's mixed-use design provides multifamily housing within walking distance of a major transit station, shops, services, restaurants, and recreational facilities. The project is a transit-oriented development (TOD) designed to maximize access to existing high-volume public transportation. The TOD approach stimulates transit usage, utilizes green building concepts, and reduces traffic generation. The ultimate effects of these strategies are reduced traffic congestion, reduced energy consumption, and reduced air pollution.

Energy efficiency and conservation have been incorporated from the outset of design. The utility is helping the project in a variety of areas, including modeling studies on natural ventilation, daylighting, solar shading, evaporative cooling, and high-efficiency heating, ventilation and air conditioning systems. The project will incorporate photovoltaic systems, and the efficient management of water through high-efficiency plumbing, landscape design, and runoff retention. The project is seeking LEED-ND (Neighborhood Development) certification.

⁹ Orange County Great Park: www.ocgp.org/

¹⁰ El Monte Transit Village: www.elmontetransitvillage.com

Results: Lessons Learned

The current funding for Sustainable Communities Program runs through mid-2009. However, we have already identified several themes and lessons learned during implementation and these are grouped by subject: program policy, program marketing, and program implementation.

Program Policy

- **Integrate program with other utility program offerings.** The program attracts projects that are also eligible for other utility energy efficiency and renewables programs in the 2006-2008 funding cycle. To avoid double counting of savings or competition among offerings, it is important to promote sustainable design in a way that is sufficiently integrated with the entire portfolio of programs and services available to the customer. Projects benefit from a utility guide in navigating the confusing variety of programs available.
- **Difficult to address complex projects in a one- to three-year funding cycle.** Many multiple building construction projects – whether an affordable housing complex or a military base redevelopment – have development cycles much longer than the current three-year funding cycle. This makes it difficult to secure energy savings in the same funding cycle as the technical services were provided. To adequately serve the needs of these projects, it is critical to structure the program to allow for long-term involvement. Program regulators and utility staff must be willing to spend funds in the program year that will not yield direct benefits for four or more years.
- **Consider requiring Enhanced Commissioning and/or Measurement Evaluation credits through LEED.** Several optional credits in LEED's Energy and Atmosphere category are particularly relevant for utility programs addressing sustainable design. While Fundamental Commissioning is required of all LEED-NC projects, the optional Enhanced Commissioning credit provides an additional level of services to ensure the systems are installed as designed and that the operators are trained properly. There is also an optional Measurement and Verification credit in LEED-NC. Both credits ensure that the project will achieve the savings originally estimated through energy efficiency.

Program Marketing

- **Reach out to the green community.** Several projects had owners, architects, or engineers participating for the first time in a utility program. Historically, many green building projects have steered clear of utility energy efficiency programs. For some, it was simply lack of familiarity with the resources available; for others it was the assumption that utility requirements would hinder the project.

- **Get involved early.** As anticipated, the earlier the program got involved, the greater the scope of impact the program can have on the project. This includes affecting building siting, stacking, orientation, etc. Early involvement helps establish the utility expertise and familiarity with the project team, creating opportunities for more interaction and influence.
- **Provide Green building education for customer representatives and utility staff.** Green building and sustainable design are hot topics these days. Projects participating in utility energy efficiency programs are beginning to incorporate sustainable design and to pursue LEED, GreenPoint or other green building certification. Providing education and talking points to all utility staff members who may interact with customers and field questions on the program and/or green building will help provide a more integrated service offering and facilitate project referrals.

Program Implementation

- **Make it easy to participate in multiple programs.** Multiple utility programs are often applicable to an eligible project. Therefore, it is important to make the program processes as simple as possible for the project teams and to coordinate to minimize overlap or duplication of efforts. If customer are contacted independently by the utility, some give up in frustration at the lack of coordination. If multiple utility representatives are required, communicate clearly to the customer the areas of responsibility. Provide a single primary point of contact whenever feasible.
- **Get regular status updates.** The program was proactive in obtaining regular updates from project teams. Some project teams had difficulty recognizing how best to integrate the utility expertise into the design process, since utility involvement at this scale is unfamiliar to most project teams. Regular contact helped to create opportunities for more interaction and influence. It also helped to identify potential problems early. A few projects had to scale back on their scope as the real estate market cooled. This uncertainty made it more difficult for projects to prioritize sustainable features. Regular check-ins provided opportunities to educate project teams on how to continue incorporating energy efficiency and sustainable design features without increasing costs.
- **Provide clear guidance on modeling requirements early.** Project teams often struggle to navigate the different modeling requirements for California's Title 24 compliance, LEED documentation, and for utility programs. This is particularly likely where the energy modeler has not worked on a project receiving utility incentives previously. In some cases, the requirements provide conflicting information on savings estimates. Projects using eQuest had the easiest time meeting the different requirements, while some projects using EnergyPro felt penalized by the utility protocols. It is useful for utility staff to anticipate questions and provide direction very early in the process to streamline modeling efforts.
- **Take advantage of case studies, fact sheets, and sample documents.** While each project is unique, many have similar questions. As has been documented through many

other programs, case studies with concrete examples help communicate what is possible more effectively than high-level statements. Whenever feasible the program developed standardized documents, such as sample specification sections, overview of LEED strategies, and sample tenant lease guidelines. These resource documents could be handed out as is, or could be customized to meet the project needs more quickly.

- **Tailor services to project teams needs.** The level of technical assistance needed varied widely by project type, complexity, and sophistication of the project team. This allowed the program to target services where it was most needed and minimize overlap or duplication of efforts. As a guiding principle, the program sought to provide targeted support to supplement the expertise in the existing project team, rather than take over specific duties.
- **Train the industry.** One of the biggest challenges ahead for green building is that the demand for experienced green building consultants is outpacing the current availability. As green building enters the mainstream, the design community needs to be trained in sustainable construction and in doing so economically. In addition to providing direct project assistance and training design teams on a project-by-project basis, the utility plans to offer trainings to raise skills among those in the industry.

Conclusion

SCE is pleased with the success of the pilot to date and anticipates a full-scale rollout in the 2009-2011 program cycle. In the next round, the program will more fully integrate with the core utility resource program offerings and will have the funding to reach a much broader audience.

As anticipated, the earlier the program got involved in the design phase, the greater the scope of influence and the ability to positively affect project performance. Early involvement helps establish the utility as a design team stakeholder, and builds comfort with the project team, creating opportunities for additional interaction and influence. Early involvement also means more design possibilities are available for consideration both at the level of the individual building and the development as whole.

Significant potential exists in this largely untapped market for utility involvement. Utilities must be willing to invest in relationships and project outcomes that may take many years to bear fruit, and to do so over timelines longer than typical planning horizons.

Too often, utilities take a “build it and they will come” attitude to program design. Utilities must find ways to add value to project teams in order to help identify and execute project goals common to both.

Buildings consume 39 percent of total U.S. energy consumption, are one of the heaviest consumers of natural resources, and produce 39 percent of US CO₂ emissions. (USGBC 2008) The potential for positively affecting the outcome of a significant portion of projects and the resources they require is tremendous. Moreover, the need to do so is urgent.

There is a considerable downside to taking such a dedicated, resource-intensive approach to new construction projects. The risk, particularly in stranding scarce utility resources in projects that may never complete, is significant. However, the risk of not acting is greater than

simply the potential for lost savings opportunities. It is the risk of not acting during the limited time during which the opportunity to avert climate change still exists.

References

- Alameda County Waste Management Authority. 2004. *ACWMA Multifamily Green Building Guidelines*. San Leandro, Calif.
- California Commissioning Collaborative. 2006. *California Commissioning Guide: New Buildings*. California.
- Kats Greg, Leon Alevantis, Adam Berman, Evan Mills, and Jeff Perlman. 2003. The Costs and Financial Benefits of Green Buildings. Washington, D.C.: Capital E.
- Matthiessen, Lisa Fay, and Peter Morris. 2007. *Cost of Green Revisited: Reexamining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption*. Los Angeles, Calif.: Davis Langdon.
- Mills, E., H. Friedman, T. Powell, N. Bourassa, D. Claridge, T. Haasl, and M.A. Piette. 2004. *The Cost-Effectiveness of Commercial-Buildings Commissioning*. Berkeley, Calif.: Lawrence Berkeley National Laboratory.
- U.S. Green Building Council. 2005. *LEED-NC Reference Guide: For New Construction. Version 2.2*. Washington, D.C.
- U.S. Green Building Council. "Green Building Facts." May 2008 , Washington, D.C. Available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=3340>, accessed 16 May 2008.