

# **New Construction Sustainable Communities Programs: Design and Implementation Strategies**

*Cynthia M. Austin and Julieann Summerford, Heschong Mahone Group, Inc.  
Jonathon Budner, Southern California Edison  
Chip Fox, San Diego Gas & Electric Company*

## **ABSTRACT**

Energy efficiency program design and implementation have historically been focused on achieving goals of annual energy savings and/or demand reduction. However, as public policies become centered on a greater sustainability context, energy efficiency programs must now consider the issues of non-energy benefits and indirect energy benefits in their design and implementation process. This paper will describe how new construction programs are meeting the sustainability challenge, providing program participants incentive and technical assistance options to consider greater green building construction practices not considered viable under the traditional energy efficiency centered programmatic design. Further, this paper will describe examples of program design and integration that enable developers to move buildings along the sustainability continuum. This paper will report on current new construction energy efficiency programs with sustainability elements to report on well-received practices and implementation recommendations, as well as identifying pitfalls which may shortchange program results. Program findings lead to a set of design and implementation program best practices, and to the rationale behind the recommendations.

## **Introduction**

Energy efficiency program design and implementation has historically been focused on achieving goals of annual energy savings and/or demand reduction. While still a primary goal for most programs, there is a growing need to consider larger sustainability goals in program design to meet federal and state policies addressing climate change. In addition, there are also greater industry focus to incorporate “green” practices. For the energy efficiency community, this means creating different programs to meet the current sustainability policy and industry needs. This paper will describe how new construction programs are designed to incorporate sustainability goals, providing program participants incentive and technical assistance options to consider greater green building construction practices not considered viable under the traditional energy efficiency centered programmatic design.

## **Background**

Progressive utilities and program implementers were contacted across the country in an attempt to find sustainable new construction programs for a peer review. The intent of the peer review is to glean well-received program design and implementation. Highlighted are three programs: Southern California Edison’s Sustainable Communities Program, San Diego Gas & Electric’s Sustainable Communities Program, and Enterprise Green Communities. All three programs encourage the construction of sustainable and energy efficient buildings and

communities. The programs target projects committed to integrating a broad spectrum of both traditional and non-traditional energy saving measures. Expertise is offered to enhance a developers design process by using an integrated design approach. This approach addresses energy savings and sustainability, beginning as early as the conceptual development phase.

### **Southern California Edison's Sustainable Communities Program**

As a new pilot program for PY2006-2008, Southern California Edison's Sustainable Communities Program was designed to assist the developers of large projects to achieve energy savings beyond the core new construction program requirements and incorporate sustainable building practices beyond energy efficiency. The program underwent significant design changes in its first program cycle, evolving from a resources program (which claimed savings and offered program rebates) to a non-resource program (which does not have pre-set savings goals). This allowed a greater emphasis on influencing the design process through technical assistance, which was deemed the greatest value by participants.. To qualify, projects committed to at least 15% (for single- or multi-family residential) or 20% (for commercial) greater than the state building energy efficiency standards (Title 24). Additionally, certification through a green building rating system (i.e. LEED®<sup>1</sup> Silver) was encouraged. The program was renewed for PY2010-2012.

### **San Diego Gas & Electric Company's Sustainable Communities Program**

Similar to Southern California Edison, San Diego Gas & Electric Company (SDG&E) offered a Sustainable Communities program in PY2006-2008 and PY2010-2011. The program is designed to encourage sustainable development, promote green building design practices, and create a variety of demonstration sites. The SDG&E program provides incentives for qualified projects that exceed Title 24 (same criteria as SCE), obtain LEED® certification, or equivalent, and evaluate on-site renewable energy systems. The program is designed as a continuum program to SDG&E's new construction energy efficiency programs.

### **Enterprise Green Communities Program**

Launched in 2004, Enterprise Green Communities provides financial support and technical expertise to enable developers to build and rehabilitate homes that to bring health, economic and environmental benefits of green building to low-income communities. To qualify, participants must implement both mandatory and a required number of optional criteria. The 2008 version of the Green Communities Criteria is purposefully aligned with LEED® for Homes. Enterprise Green Communities programs are being implemented in Florida, Minnesota, New York, Ohio, California, and New Mexico.

### **Relevance of Programs**

The review of these three programs served to inform findings and recommendations of best practices. Findings included promotion of program comprehensiveness, integration, and cross-promotional strategies. Recommendations included greater coordination among programs with related and complementary goals, simplifying participation, bundling services (internally

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<sup>1</sup> United States Green Building Council's Leadership in Energy and Environmental Design's Rating System

and externally, increasing delivery efficiency through one portal, leveraging combined synergies, and leveraging relationships from complementary organizations and trade allies

## **Methodology**

This paper collected information as part of two process evaluations conducted for San Diego Gas & Electric Company's New Construction programs (of which included their Sustainable Communities program) and Southern California Edison's Sustainable Communities program. The studies concentrated on the following study subjects:

- Program process evaluation
- Identifying program recruitment opportunities
- Concept testing of potential program design improvements
- Learning from peer program experiences

Recommendations were derived from interviews with program staff, interviews with program participants and nonparticipants, and a review of a similar peer program's process evaluation and recommendations. Program staff were interviewed to gain an understanding of their current and planned program activities, issues, and goals. Staff was also asked about opportunities for expansion into various market segments. Program participants and nonparticipants were interviewed to gather their insights on the current new construction market, their views on sustainability, and what type of program services they are looking for. Program participants were also asked for their recommendations in improving the program.

For the process evaluation study, an analysis of program's current process was conducted in order to identify opportunities to enhance program integration, streamline program documentation requirements, and enhance program process procedures. The process evaluation focused on opportunities for improving program integration between internal core programs as well as external complimentary programs.

To achieve the second research objective, the study focused on exploring opportunities to recruit program participants in various market sectors through enhanced coordination with external complementary and internal core programs. The goal of this effort was to determine the best growth potential to reach new customers, either by market sector type or project type.

Concept testing focused on proposed program improvements derived from the program manager and implementer's experience with program participant. Program participants provided feedback on the relative value of possible program revisions and/or additions.

Finally, a review of findings from a similar program's process evaluation was carried out to identify recommendations in support of the fourth research objective, to determine best practices and lessons learned that could be applied to the SCE SC Program.

## **Findings**

Below are findings collected from the studies. Understanding how energy efficiency programs should interact with the sustainability building community was a key factor in program success.

## **Energy Efficiency and Sustainability Nexus**

According to respondents, the building community varies in their understanding and interest in the relationship between energy efficiency and sustainability. According to program implementers, program participants (developers and builders) were still learning how their projects impacted energy savings and resulted in reduction of greenhouse gas emissions. Some developers were perceived to be solely concerned with how program incentives could help reduce the cost associated with upgrades. Program representatives responded that they strive to help builders understand the importance of energy efficiency as it relates to sustainability. A common theme from all staff interviews was that the building community does not associate energy efficiency from a performance, quality, or sustainability perspective as common practice. This finding is substantiated in two Northwest Energy Efficiency Alliance studies (2000 NEEA , 2001 NEEA ).

Interview respondents indicated that the customer disconnect between energy efficiency and sustainability was due in part to the lack of focus in sustainability in prior programs. Energy efficiency program implementers believe builders consider sustainability as a popular trend versus a comprehensive change in building practices. The resulting perception is that energy efficiency is distinct from sustainable building practices instead of included as part of sustainability. The reason for this misconception is the lack of a common message between energy efficiency and sustainability. While most developers learn about energy efficiency from utilities, their information on sustainability is gathered from other places (media, discovery programs, cities, etc.).

### **Program Integrations with the Sustainability Community**

Staff indicated that every effort should be made to increase the program visibility within the green community such as the U.S. Green Building Council, Urban Land Institute (ULI), etc. Several staff indicated that offering program tools, such as Autodesk® Green Building Studio®, to developers through green organizations, such as the U.S. Green Building Council Chapters, boost the perceived value of a program to the established green building programs. Respondents suggested establishing partnerships with agencies such as water, landscaping and other programs that offer rebates/resources. This will allow cross promotion between programs, resources, and comprehensive sustainability concepts. Within utilities, better integration among new construction, transmission and distribution, planning, public affairs, and right-of-way was recommended. This is not only critical in terms of minimizing customer confusion, but also to identify and influence large projects early in the entitlement phase.

Staff also shared that their experiences in working with projects indicate that some developers prefer others to try-out new strategies. Instead, these developers are influenced by leaders who share their experience and success. One staff suggested co-hosting developer round tables with trusted organizations such ULI and USGBC to encourage participants to share successes and challenges. Case studies were also noted as valued technical assistance in terms of sharing peer experience and expertise. As program staff and participant expertise grows, projects benefit from the experiences of an increasingly larger pool of projects. In other words, success stories from one project can easily migrate to another project. This suggests that a program should look to create case studies from successful projects.

## **Technical Assistance**

Developers need more guidance and expert intervention to respond to design teams, whom are varied in training and experience. Study respondents agreed that technical assistance be offered very early in the design process in order to impact the design process. Important early design decisions include site orientation and horizontal design considerations. Training should also focus on the importance of integrated design to overcome the common silo mentality and promote high-performance design, rather than compliance. Also, training should emphasize the importance of operations and maintenance as a critical factor for on-going energy savings. Respondents felt that adding an operations and maintenance element to the program will help to ensure the longevity of the energy efficiency and green elements to remain consistent with sustainability philosophy.

## **Best Practices**

Below are a set of program design and implementation recommendations resulting from the studies.

### **Early and Well-Defined Intervention Points**

For a well-designed sustainable new construction program, there was widespread agreement that intervention was needed at the earliest possible project stages for maximum effectiveness. However, a program implementation period may not always coincide with the participating project design window. In particular, pilot programs may find it difficult to find projects that align with their often limited implementation period. Once a program is established over multiple program cycles, there will be greater opportunities to find candidate projects. The recommendation related to early intervention is to clearly identify and communicate the critical points that a program can change a project's direction. This includes the following:

- Land use/community design
- Design team criteria and selection
- Building design

For each of these intervention points, projects often require interaction with utility departments (such as Transmission & Distribution to set up hook-up for power lines) and external organizations (such as city planning departments). Thus, it would be highly beneficial for a program to establish communication channels with internal and external agencies for notification on potential projects.

### **Address Long-Term Build Outs**

Because of economic or personnel issues, projects may have longer term build-outs (20 years) than the program cycle time-frame. Under this situation, a program can offer a “general plan” for the project that will establish the project goals and philosophy in terms of sustainability. This plan will allow for continued commitment, while addressing dynamic issues such as code changes, technology improvements, etc. The “plan” could be in the form of a template that the developer could tailor to reflect the original project goals.

## **Design Team Selection and Design Assistance Needs Assessment**

A key lesson learned from the program was the importance of a well-experienced design team for project success. A program could have valuable input and influence on establishing and helping a participant select project design teams. For instance, program technical assistance can provide design team qualifications and experience requirements and/or conduct project design team needs assessment to determine the level of assistance required. When establishing the design team qualifications, energy efficiency could be a prominent component and perhaps could inspire those who do not possess those qualifications to seek them out through training.

A related recommendation is to conduct training for the design community, communicating the qualifications and experience requirements that a program will be promoting. Also, the program could provide a curriculum and path for those that do not meet the qualifications, but desires to expand their sustainable/energy expertise.

## **Sustainable Communities Forums**

To minimize confusion among green programs, a program could host a Sustainable Communities Forum. A forum could introduce developers and builders to available green program offerings, planning and building departments, and other utilities (gas, electric, and water) programs and services.

Also, for organizations with multiple projects, a program representative should be appointed to serve as the main point of contact. This representative could identify the project needs and match them up with the appropriate programs and services.

## **Sustainable Building Lifecycle Plan**

A key component of sustainability is continued energy and environmental management beyond the completion of construction. A program could provide tailored technical assistance for a template roadmap. This roadmap will allow developers/building owners to continue sustainable/green/efficiency practices throughout the building lifecycle:

- Land use/community design
- Building design and construction
- Verification/commissioning
- Benchmarking
- Operations and maintenance
- Rehabilitation.

The template can include a sustainability guide for customers. An important addition would be to address the behavioral factor (occupants), by providing guidance on how to help occupants properly use the building, facilities and equipment.

## **SCP Toolbox and Training**

A consistent theme among the new construction design community was the need for a central place to go for all the “best” industry tools with an explanation of why they are valuable.

As part of a program technical training, program staff could train participants on the use of these tools. This toolbox could potentially contain:

- A Green Calculator<sup>2</sup> - a model that takes inputs for a specific project or community and provides an estimated energy impact number in return. The Green Calculator could be designed to be simple and easy to use for building and community applications. It is divided into three major categories each with a corresponding tab: materials, water, and trees. The materials tab allows the user to input and compare materials and building assemblies. The water tab estimates embodied energy of water, depending on your region, allowing for comparison of irrigation, appliances, and fixtures. The trees tab takes into consideration reduced cooling loads due to shading and evapotranspiration, based on climate type.
- An Investment Calculator<sup>3</sup> - a spreadsheet that could compare side by side community and or building design option cost analysis including simple payback, lifecycle cost analysis, net present value, return on investment, and internal rate of return. This spreadsheet could take into consideration first cost, incremental costs, new construction and rehabilitation, incentives, funding, financing, tax, or other financial benefits as well as operations and maintenance cost savings
- A sustainable communities design guidelines and analysis tool (several available) that can guide developers and their land use planners to design and assess their community layout options.

## **Net-Zero Communities**

Net-zero communities and buildings have become an important goal for various government policies. For example, in California, net-zero communities and buildings are integral to the AB 32 Climate Change Scoping Plan and the CPUC Energy Efficiency Strategic Plan. A sustainable new construction program is the perfect venue to influence not only renewables and net zero at the building level, but also at the community level. By working with developers early in the community design process, a program has the opportunity to guide a community to develop a community-wide PV system to supply its energy needs.

## **Provide Recognition**

Utility, industry, or peer recognition helps designers win projects, builders to sell buildings, and owners to enhance their company's image and sell their projects. Plus, program endorsement helps justify the efficiency investment. Often, recognition establishes a long-term commitment to sustainability. A program can offer recognition for owners and design teams who design "out of the ordinary" projects by creating industry awards, writing articles, and/or publishing case studies to showcase outstanding owner-developers and their projects.. Participants appreciate and value program endorsement and recognition.

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<sup>2</sup> Energy Design Resources is currently developing an Excel-based Green Calculator program. EDR also offer Green Building Studio, a web-based energy analysis service that performs whole building analysis, optimizing energy efficiency, and working toward carbon neutrality.

<sup>3</sup> Energy Design Resources offers eValuator, a Windows™-based program that calculates the lifecycle benefits of investments that improve building design.

## **Offer Performance-Based Incentives**

Thinking out of the box and going beyond core program requirements takes more time. The designers are motivated by and value the design team incentives and appreciate being paid a portion early in the design process. This is critical to compensate or reward the designers for their often uncompensated extra effort and time in achieving and documenting program goals and requirements. A program can offer performance-based incentives to both the developer and the design team. If applicable, these incentives would be above and beyond already existing new construction energy efficiency program incentives. These incentives could potentially be paid early to offset the cost of the upfront design and coordination costs for both the developer and design team. Proposed incentives could cover LEED, BIG, etc, costs that push the green element down to the core construction programs and providing additional “bonus” incentives for these efforts and certifications. Additionally, a program can determine incentives based on the incremental cost for sustainable community design for changes made from “business as usual” to a “sustainable design”, whereby the costs might be fewer housing units due to alternative street grid or design or by optimizing building orientation, etc.

## **Internal Coordination: Offer Customers a Comprehensive Package of Services**

A consistent message given by customers simplifies program participation. For organizations already offering existing energy efficiency programs, a seamless and comprehensive package of programs with the ability to select various components could be provided. This allows a builder/developer to choose from a range of strategies depending on their intended level of effort. For example, they could choose to participate at varying program levels ranging from the following:

- Core energy efficiency program requirements
- “Out of the box” energy efficiency measures/design strategies
- Green<sup>4</sup> certification (LEED, BIG/GreenPoint Rated)
- Solar/PV/zero energy options.

By allowing participation choices, an organization provides a united front to meet the customer’s needs. Internally, an organization can create a mechanism that customers can see the nexus among all of the internal programs and be able to select the options appropriate for their project. This would require educating all program staff that comes in contact with the same customers about their program options. Clearly defined roles and program boundaries within program staff and consistent coordination is required to ensure they are conversant about the program and are promoting it to projects early enough in the design process.

The most prevalent concern about program processes involved confusion around more than one application and program name. If one comprehensive package of services is not possible, then perhaps one comprehensive new construction application with various sections pertaining to different programs is possible.

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<sup>4</sup> The term green refers to design and construction that encompasses more than energy efficiency and participates in a green certification program including but not limited to LEED and Built it Green’s Green Point Rated certification programs. In the context of SCP, sustainability is an umbrella term that encompasses both energy efficiency and green as well as PV/solar.

For projects participating in more than one program, uniting the various contacts and establishing one central point of contact for all inquiries would help to minimize the confusion. Collectively, the appropriate programs representatives should meet with participants and act as a united front in solving the builders/developers' problems, rather than as silo programs. This customer-solution oriented approach could provide a comprehensive approach to mix-use, mixed- vintage projects.

### **External Coordination: Focus on Synergies with External Programs**

Similar to internal coordination, a sustainable new construction program should carefully coordinate and integrate with external green program and agency requirements. Perhaps coordinating a diagram of the various programs and their synergies and benefits would help owners/developers understand each program's role and to solidify the relationship between internal and external programs. Furthermore, it allows developers understand the nexus among green, energy efficiency, and sustainability and to help create a sense that green, energy, water, and PV, are all included in the sustainability process.

### **Market Potential – Mixed Use and Rehab**

With current economic conditions and a decline in new construction, infill projects may include both new construction and varying degrees of existing building rehabilitation projects (rehab). This could provide an opportunity for a program to provide “comprehensive sustainable community solutions” to new construction as well as existing buildings rehabs. Existing buildings rehabs provide an opportunity for substantial energy savings, but can result in a long-term lost opportunity if not addressed. Based on the study review, there was program service gap for rehab projects. Thus, an opportunity exists for new construction programs to include rehab program elements.

### **Recommendations in Action**

For PY2010-2012 programs, the California investor-owned utilities<sup>5</sup> have incorporated the following program additions into their new construction programs (residential, commercial, and Sustainable Communities. For both nonresidential and residential new construction, programs are providing a cross-cutting focus on energy efficiency, sustainable design and construction, green building practices, and emerging technologies. To encourage deeper energy savings, a sliding scale incentive structure was created. The baseline entry level of the program is fifteen percent above the state mandated building code. The incentives increase incrementally at each one percent of improvement as well as offering an incentive for projects that achieve thirty percent above building code.

Projects that achieve additional “green” certifications also qualify for additional program incentives. For residential, ENERGY STAR® requirements will qualify for an additional 10% bonus (above base incentives). Green Home Certification (Build it Green, LEED, etc) may

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<sup>5</sup> Pacific Gas & Electric Company, San Diego Gas & Electric Company, Southern California Edison, and Southern California Gas Company

qualify for an additional 10% bonus. Compact Home may qualify for a 15% bonus if the home is at least 10% smaller than the LEED for Homes square footage threshold for new construction, by number of bedrooms.

Beyond project specific incentives, program incentives are offered for design team charrettes to stimulate ideas and greater coordination among the design team to create “greener” projects.

## **Conclusion**

As public policies become centered on a greater sustainability context, energy efficiency programs must now consider the issues of non-energy benefits and indirect energy benefits in their design and implementation process. This requires an implementation and marketing changes from the traditional energy efficiency program paradigm. An early leader in this process change is new constructions energy efficiency programs. In transitioning to a sustainability focus, these programs learned change was required from the traditional business-as-usual approach. This included greater coordination efforts with the sustainability community, strengthening marketing and technical assistance to include green elements, and offering program incentives beyond energy savings requirements.

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