ENERGY EFFICIENCY PARTNERSHIP PROGRAM BEST PRACTICE AWARDS APPLICATION FORM

Submission Deadline: April 4, 2010, 6:00 p.m., no exceptions

Tenth Annual CA Higher Education Sustainability Conference - hosted by CSU Long Beach

This form is only for nominations in the Overall Sustainable Design category

I. Contact Information

1. Campus: Cal Poly State University, San Luis Obispo
2. Department: Facilities Planning
3. Contact name/title: Joel Neel, Senior Associate Director
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II. Project Information

1. Project name: Poly Canyon Village

2. Project location: Cal Poly San Luis Obispo

3. Completion date of design and completion date (or estimated completion date) of construction: Project was delivered using Design-Build. Design was completed in March, 2006. Construction was completed in August, 2009.

4. Project budget: $300,000,000

5. Estimated (for projects design) or actual (for constructed projects) annual energy savings versus code compliant building (kWh, therms), or actual: 4,749,800 kWh/yr

6. Estimated (for projects design) or actual (for constructed projects) annual cost savings (please state assumptions for electricity and gas rates): $475,000/yr @ $0.10/kWh (see attached energy report)

7. Relevancy to the Best Practice Program – Please provide a detailed narrative of the project, highlighting those project features that qualify it as a best practice of potential interest to other campuses

   Project Summary

   Poly Canyon Village is a new, multi-building, mixed-use student housing community at Cal Poly San Luis Obispo. The site is situated on over thirty acres of gently to moderately sloping land in

Poly Canyon. The Village consists of nine buildings with 618 apartment units, as well as retail spaces and resident support services. Two parking structures provide a total of 1,926 parking spaces.

The project provides 2,670 additional on-campus beds, bringing the total on campus resident population to 6,400 – over a third of total enrollment. Implementing Cal Poly's mission of environmental responsibility, the 1,405,118 square foot design-build Poly Canyon Village promotes a healthy living environment for its students and respect towards Poly Canyon and Brizzolara Creek.

Background

Although originally envisioned as a developer financed and delivered project, in an effort to reduce costs, Cal Poly decided to put the Poly Canyon Village project out to bid as a design-build project in Fall 2004. The Clark Construction and Niles Bolton Associates design-build team worked carefully to bring the project within budget parameters and, at the same time, satisfy the complete project scope. Building systems and materials were analyzed and refined, unit plans were modified, building configurations were efficiently re-assembled, construction schedules were shortened, parking structure layouts were refined, and the site plan was re-worked, while still fulfilling programmatic needs.

In the spring of 2005, a final proposal was submitted to Cal Poly which eliminated two buildings, reducing the buildings' impact on the site, while still providing the total required bed-count. The design-build team committed to delivering the project one year earlier than requested in the RFP, and established a goal of achieving LEED certification, and in fact, ultimately earned LEED Gold.

Project Details

The Site

The project is located at the northeast corner of the Cal Poly campus. Prior to its use as a residential community, the land was used by the College of Agriculture as grazing pasture, a confined animal feed lot, an abbatoir, a feed mill, and agricultural equipment junk yard. These previous uses had a negative impact on the site soil, as well as the adjacent Brizzolara Creek, which runs along the southern and eastern project edge. The redevelopment of the site provided an opportunity for the remediation of the damaged brownfield land, as well as habitat restoration of the creek.

Poly Canyon Village was envisioned in the Cal Poly Master Plan as a way to provide additional sophomore student housing on campus, ease housing resources within the city of San Luis Obispo, and reduce campus greenhouse gas emissions due to commuting. The site is generally separated from the campus core by support facilities, topography and other physical features. Therefore, it was vital to design Poly Canyon Village as an autonomous community, where students could have easy access to necessary services, while still living a short walk away from the rest of campus and other amenities.

The Village

A community hub was created for students in the Village Center, which includes Housing Administration offices, a recreational swimming pool, exterior and interior recreation activity areas, study rooms, a knowledge center, conference rooms, and mail center. The Plaza, at the heart of the Village Center, includes outside seating and lawn areas with Wi-Fi and electrical service. Plaza retail amenities include a juice store, a bagel/sandwich shop, a coffee and tea establishment, a market, and an ATM. Strong connections between the indoor and outdoor activity spaces on the Plaza have been provided through large, operable, storefront windows, taking advantage of the mild climate.

Poly Canyon Village is comprised of three neighborhoods, each neighborhood being designed with a distinct architectural style: Urbane, Rustic Lodge, and Agrarian. The three neighborhoods allow smaller communities to grow within the fabric of the larger Village context. Both active and passive outdoor gathering spaces framed by buildings and landscaping are provided in each neighborhood. Each building contains a common lobby with services available to students, such as laundry rooms, lounges, and intimate study areas intended to provide an array of learning and social opportunities. Through attention to programmatic elements, awareness of budgetary constraints, and promotion of environmental stewardship, Poly Canyon Village has accomplished the University's vision to provide a new student housing center, while addressing the challenges of a large-scale project and serving as a regional model for sustainable design.

Key sustainable design features include:

Sustainable Sites

- Preparation of the 30 acre site involved decommissioning of several aging industrial-type educational facilities including a feedmill and abbatoir, which were replaced by new state of

the art facilities located on more remote campus agricultural land, along with the animal feedlot.

- Approximately one acre of brownfield redevelopment was undertaken on a contaminated junk yard historically used by the College of Agriculture. In addition, 4 acres of the Brizzolara Creek bed and riparian area underwent removal of invasive plant species, replanting of native species, removal of a vehicle crossing/culvert and other habitat restoration efforts to improve fish migration by native anadromous steelhead trout. These mitigation efforts are being monitored by an environmental consultant through 2014.
- The project included integration of a bioswale, a vegetation-lined drainage channel, through the center of the site collects 80-90% of sediment and pollution in surface water runoff.

Water Efficiency

- Fifty-eight percent of the total planting areas require no permanent irrigation. Planting areas were designed with native and drought-tolerant plant species. Lawn areas were minimized to conserve water and are well-located for sports activities and seating. Landscape maintenance personnel utilize mulching mowers to reduce turf water use, and cover planting areas with mulch produced by campus Farm Operations, from composted campus animal waste and greenwaste.
- Low-flow toilets, showerheads and faucet aerators reduce indoor water use by more than 30%.

Energy & Atmosphere

- The Village reduced its design energy cost by 51%, in comparison to the ASHRAE Standard 90.1-1999 energy cost budget, which surpasses California's strict energy efficiency standards through the use of high efficiency window glazing, radiant heating panels, and natural ventilation. Mechanical systems utilize variable speed hydronic pumping, and ceiling radiant heating panels in all resident apartments. Low emissivity window glazing absorbs visible light for glare control and reflects most invisible solar infrared rays. The low-emittance coating reflects heat back to its source, providing comfortable temperatures year-round.
- The complex includes two central plants with high efficiency gas fired hot water boilers, as well as a 500 kW cogeneration system to generate electricity while converting waste heat to hot water for space heating, domestic hot water, and heating of a recreational swimming pool.
- Lighting systems were designed to maximize energy efficiency, primarily using linear and compact fluorescent lighting technology. High pressure sodium lighting, originally proposed

for the parking structures, was changed to low wattage linear fluorescent. The lighting system design achieves a lighting density that outperforms ASHRAE 90.1-2001 by 46% for the apartment spaces, an average of 26% for offices, food service and retail space, and 73% in the parking structures.

- Ozone depleting chemicals, such as HCFCs, CFCs, and halons, were restricted from the air conditioning systems, which were used in the office and retail spaces, and from the building fire suppression systems. Only administrative and retail spaces are air conditioned, and do so via high efficiency package AC units that utilize either variable air volume or variable refrigerant control, and are monitored and controlled by the campus building automation system.

Materials & Resources

- Use of materials with a high amount of pre- and post-consumer recycled content, such as doors, gypsum wall board, steel decking, and composite wood cabinetry, reduced the impacts of processing new materials.
- Regional materials and resources, such as local concrete, steel, and metal stud trusses resulted in lower carbon emissions due to the reduction in transportation needs.
- Through careful material management and recycling efforts, over 90% of all construction waste (over 12,000 tons) was diverted from landfill and either reused or recycled.
- The Cal Poly recycling program is dedicated to providing services and tools to promote recycling on campus. Presently 50% of potential trash is diverted from the landfill. For the eleventh year, Campus Dining has been a Waste Reduction Awards Program (WRAP) winner for its efforts in waste reduction and recycling.

Indoor Environmental Quality

- Paints, sealants, carpeting, and agrifiber products that are low in volatile organic compounds (VOCs) were selected for the project. In addition to MERV 8 air filters, the low VOC finishes reduced the amount of harmful indoor air contaminants students and visitors are exposed to.
- Providing access to natural daylight and views to the exterior from within the units was a primary focus in the design of the buildings, connecting the indoor spaces to surrounding Poly Canyon.
- Controllability of lighting and thermal settings provides additional comfort in San Luis Obispo's mild climate.

Transportation

- Increasing on campus residency is one of the core goals of the campus Master Plan to reduce emissions, traffic, and other environmental impact of students commuting to and from campus. By bringing an additional 2,670 residents on campus, Cal Poly's greenhouse gas emissions due to commuting were reduced by 2.4 million pounds of CO2 per year, or 17%.
- Two parking structures, with a total of 1,926 spaces, were intentionally designed to provide fewer parking spaces than the 2,670 residents in order to promote bicycling and use of alternative transportation.
- Covered and lighted bike storage is provided for over 50% of total residents, encouraging students and staff to use alternative transportation.
- The project included development of two main bicycle/pedestrian thoroughfares connecting to the campus core. At the campus terminus of the western path, a full block of Via Carta Road was closed to vehicle traffic and converted to a pedestrian plaza with bike lanes, providing connection to one of two major campus regional transit hubs. Free bus service is provided to all campus faculty, staff, and students.

Educational Outreach

- The University has provided its students an Educational Outreach Program, to further educate the students on sustainable living through sustainable design. The school provides numerous class tours of Poly Canyon Village, where guides describe the sustainable features of the Village, the building systems, and the two central plants. The University has also created a website which promotes the sustainable features of the Village, with a printable case study and online brochure: http://www.housing.calpoly.edu/pcv_sustainability/index.html
- Cal Poly's Green Campus Program interns run an annual month-long energy and water conservation competition, which involves all nine buildings and 2,670 residents. Students are educated about sustainable living, given behavioral strategies to reduce their environmental footprint, and encouraged to come up with innovative ideas of their own through the Green Campus website and Facebook pages: http://www.afd.calpoly.edu/greencampus/pcv_comp.asp http://www.facebook.com/pages/Green-Campus-Program-Cal-Poly/80222012710

8. Please describe the design of the building envelope, focusing on its effect on the facility's overall energy efficiency.

The building structural systems, envelope, and energy systems were designed in an integrated manner to achieve high energy efficiency, reduce construction and maintenance costs, improve indoor air quality, and enhance constructability to accelerate the project schedule.

- Light gage steel stud construction, utilizing recycled steel, was used to create preassembled wall panels with DensGlas gypboard exterior sheathing. DensGlas uses fiberglass instead of paper facing, making it highly mold resistant if exposed to moisture. The wall sections utilize R13 insulation, with a moisture/vapor barrier wrap and exterior stucco finish.
- Low-emissivity window glazing absorbs visible light for glare control and reflects most invisible solar infrared rays. The low-emittance coating reflects heat back to its source, providing comfortable temperatures year-round. Apartment window systems use vinyl frame double glazed, argon filled, low emissivity assemblies to reduce solar heat gain, and are operable to provide natural ventilation. Aluminum storefront windows also have low SHGC and U factor (see attached PCV Energy Report Pages for specifications and performance).
- Ceilings and attics are insulated with R30 batting, and attic spaces are well ventilated.
- Poly Canyon Village reduced its design energy cost by 51%, in comparison to the ASHRAE Standard 90.1-1999 energy cost budget, which surpasses California's strict energy efficiency standards through the use of high efficiency window glazing, radiant heating panels, and natural ventilation.

9. Design integration – Describe the way in which this project incorporated stakeholders from multiple disciplines into the design process. Describe how collaboration produced sustainable solutions and improved the project's performance.

A broad and diverse stakeholder team was assembled early in the project development stage (prior to creation of bridging documents) and worked together actively and cooperatively throughout planning, design, construction, commissioning, and occupancy. This group included representatives from:

- Cal Poly staff: University Housing, Facilities Planning, and Facility Services including operations and maintenance staff.
- Cal Poly academic community: Campus faculty members from architecture, engineering, liberal arts, agriculture, and a broad variety of interested students.
- The Design/Build team: Clark/NBA, with 20 design consultants and 10 key subcontractors.
- Utility account reps and Savings by Design reps.
- Local community members and campus residential neighbors.

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Five large, open campus and community meetings were held, including a sustainability charrette. Participation and input was encouraged from all stakeholders and led to a number of design improvements and innovations. The group collaborated to brainstorm ideas, define project goals and performance requirements, implement and improve campus standards, control costs, ensure quality and constructability, all while striving to enhance energy efficiency, sustainable features, and maintainability. This integrated design process has been further refined and institutionalized, becoming a guiding principle for design for Facilities Planning and Facility Services:
http://www.afd.calpoly.edu/sustainability/planning.asp?pid=4
http://www.afd.calpoly.edu/sustainability/docs/Capital%20Project%20Review%20Procedure.doc

Some of the major improvements and innovations that came out of this collaborative process were:

- The originally proposed design included distributed heating equipment in each of 11 buildings. A feasibility study and life cycle cost analysis evaluated distributed equipment vs. one or two central heating plants. It was found that two central plants had the lowest life cycle cost, and this approach was adopted.
- Serving the complex from central plants created an opportunity to incorporate cogeneration. Cogeneration was originally proposed using a total of eight 60 kW Capstone microturbines. Consultation with the Gas Company and other campuses that had installed microturbines identified a number of problems with reliability and emissions compliance. Ultimately, it was decided this project was not a good application for microturbines, and that they would not be able to meet the upcoming CARB 2007 emissions restrictions. The design was modified to utilize natural gas reciprocating engines with a total of 500 kW generating capacity.
- The parking structures were originally designed with 150W high pressure sodium lighting. Due to the success of a recent retrofit at another parking structure on campus, the design was modified to utilize the same style linear fluorescent fixtures with T8 lamps. Further, the circuiting was modified so that the perimeter fixtures could be switched off during the daytime via photocell control.
- It was known early on that a simple hydronic heating system using convectors or radiators would be the most efficient method of heating the apartments. However, the classic installation location, immediately below the windows, usually obstructs a prime location of the floor plan. Students frequently block radiators with furniture, impeding the natural flow of air and making maintenance difficult. It was decided that we would try ceiling radiant

panels to gain the same energy performance, with no problems due to furniture arrangement, and easy maintenance access. This proved to be very successful.

- Early in design, the design-build contractor proposed a plan to rearrange the building configuration -reducing from 11 to 9 buildings total, and increasing each building to 5 stories. This reduced total exposed envelope while delivering the required number of beds, and reduced infrastructure costs for utilities.
- Input from campus landscape staff and faculty from the Landscape Architecture department resulted in selection of water efficient landscape optimized for the local Mediterranean climate.
- Coordination with Landscape Services and Farm Ops, as well as the Irrigation Training Resource Center resulted in diverting nearly all stormwater to Drumm reservoir, which is ultimately used for irrigation. This resulted in virtually no increase in environmental affects due to site runoff from the project.
- The entire team worked toward the common goal of LEED Certification, ultimately achieving LEED Gold.

10. Load management – Describe how the project provides on-peak electricity demand reduction, or demand response capability.

The design of the Poly Canyon Village project incorporated many energy efficiency features that reduce the complex's peak power demand.

- Well insulated wall assemblies and high performance glazing contribute to reduced heating loads.
- The hydronic heating system, using radiant ceiling panels, uses significantly less energy than a powered ventilation system for delivery of heating.
- The lighting system design achieves a lighting density that outperforms ASHRAE 90.1-2001 by 46% for the apartment spaces, an average of 26% for offices, food service and retail space, and 73% in the parking structures.
- The Project has installed a 500 kW cogeneration plant, comprised of two 250 kW gas engines, that effectively reduces the peak electricity demand by as much as 500 kW.
- Between cogeneration and efficiency measures, it is estimated that the peak demand is reduced by 1.2 MW from a baseline compliant building. In the event of a demand response event, load can be reduced by a further 500 kW through the building automation system.

11. If applicable, describe how the project has been received by building occupants. Describe what has been met with satisfaction or dissatisfaction, and why.

    The greatest indicator of satisfaction has been the overwhelming response of students wishing to live in Poly Canyon. When the apartments first opened up in Fall of 2008, they were sold out within three weeks, and have done so every year since. When asked, students almost unanimously state that they love living in the complex for the amenities, the services offered, the natural setting of the site, and the spectacular views. The most frequent complaint received has been regarding the lack of air conditioning in the apartments. When this happens, we inform the residents that the building was intentionally designed without air conditioning to make it more sustainable, and educate them how to properly use the windows to take advantage of natural ventilation.

III. Additional information *(Please limit to 5 MB per submission)*

Please submit supporting documentation consisting of photos (of completed projects), plans, and elevations so that the selection committee can adequately evaluate the building design.

Please provide any additional information necessary to assist the selection committee in understanding and evaluating the project.

IV. Nomination submittal

Send completed Nominations to Andy Coghlan, Sustainability Specialist at the University of California Office of the President. All submittals must be received by 6:00 p.m. on Friday, April 4, no exceptions.