



# Ultra-Low Energy Project Profile

Multifamily Residence



Photos: Bruce Damonte

## OVERVIEW

### Site Details

**Building Size:** 19,875 SF

**Location:** Sacramento, California

**Construction Type:** New

**Construction Year:** 2012

**Building Type:** Multifamily

**CA Climate Zone:** 12

### Measured Energy Stats

<b>31</b>	<b>-</b>	<b>6</b>	<b>=</b>	<b>25</b>
BUILDING'S TOTAL EUI		RENEWABLE PRODUCTION EUI		BUILDING'S NET EUI

### Site Energy Use Index (EUI) kBtu/SF/year

The Energy Equation: **the building energy use minus the renewables production equals the net energy of the building.** Buildings may be 'Getting to Zero' and have a net EUI above zero. If renewable production exceeds energy use its net EUI is below zero (negative) and it is creating surplus energy.

## LA VALENTINA NORTH TOWNHOMES

The La Valentine North Townhome project is the result of a partnership between SMUD and the owner/developer of the project, Domus Development LLC. The 18-unit affordable multifamily development is a research and demonstration project in SMUD's Townhouse Home of the Future (HOF) program. The team considered the reduction of solar heat gain, a large energy driver in Sacramento's hot climate, as a primary design objective. This Home of the Future Demonstration Program project features promising and efficient technologies that can be shared as lessons with local builders and ideally incorporated into SMUD's SolarSmart Homes program.

### Planning & Design Approach

Overarching project goals:

- Cut annual source energy use by 80% and achieve zero peak electricity demand during SMUD's 4-7 pm summertime peak period
- Serve as a demonstration for advanced framing and construction techniques, efficient building features and equipment and a net-metered solar photovoltaic system
- Implement a measurement and verification plan for the two years of occupancy to determine energy savings and identify lessons learned

### Energy Efficiency Strategies & Features

**Design Process:** Early in the design process the design team collaborated closely with NREL using their Building Energy Optimization (BEOpt) software to determine what efficiency measures were most likely to deliver the greatest potential savings compared to a home built to California's Title-24 standards.

**Envelope:** A tight and efficient envelope is key to the performance. The design team specified R-25 wall insulation (Title 24 requires R-19), achieved by using blown-in cellulose in the wall cavities and two inches of continuous rigid insulation on the exterior of the walls. Contractors devoted careful attention to sealing all joints and seams with either high performance caulking or spray foam.



For more information:  
[newbuildings.org/zero-energy](http://newbuildings.org/zero-energy)



### Team/Owner Details

**Owner:** Domus Development LLC

**Architect:** YHLA Architects

**General Contractor:** Brown Construction Inc.

**Energy Consultant:** National Renewable Energy Laboratory (NREL), Red Tape Express, Sacramento Municipal Utility District (SMUD)

### Financing & Cost

**Total Project Cost:** \$4,702,500

**Cost / SF:** \$236

**Solar PV system:** \$238,500

**Energy Efficiency measures:** \$313,162

**PG&E gas rebate:** \$5,863

**SMUD solar incentive:** \$95,625

**SMUD SolarSmart Home incentive:** \$19,800

**SMUD R&D incentive:** \$225,100

### Awards

LEED® Platinum

**Solar Gain Reduction/Daylighting:** Design components included window orientation, trellises, overhangs, awnings and shading to reduce cooling loads while allowing low winter sun angles access for heat and light to the space.

**Efficient Equipment:** The units are cooled by an above-code, high performance split-system air conditioner and heated by a 97% efficient condensing gas furnace. They also feature tank-less gas hot water heaters, high efficiency lighting fixtures and Energy Star-rated dishwashers and refrigerators.

**Renewable System:** The roof-mounted photovoltaic system is a 34.1 kW AC rated system. The system is virtually net-metered so that excess energy can flow directly back to the grid at any time. Credits from the utility are divided equally among the tenants, allowing low-income multifamily tenants to receive the financial benefits of the solar system rather than all the benefits going to the building owner.

### Lessons Learned

- Natural gas loads are a challenge in multifamily buildings. While the project is performing at 60% energy savings compared to a project built to California's Title 24 standards, it would need additional renewables to meet the projects initial goal of 80%. However, the roof size is a limiting factor.
- While a solar hot water system would have helped the project achieve its 80% goal, the low cost of natural gas at the time of construction, the large financial incentives for photovoltaics and the space constraints of the roof made it prohibitively expensive.
- The construction team was not familiar with installing the exterior rigid foam with three-coats of stucco cladding specified by the design team. There was concern that the rigid insulation would not be able to support the stucco, so the proposed solution was to cut the rigid insulation into two-foot sections held in place by metal z-clips. This resulted in a thermal penalty to the overall performance of the wall.
- The occupant role is critical. The heating and air-conditioning settings and attention to reducing plug loads are keys to meeting the outcomes. Some units are close to the target, while others are above.

### For More Information

**SMUD Article:** <http://goo.gl/iJpB4p>

**Domus Case Study:** <http://goo.gl/sGMQ9u>



Administered by California utilities, Savings By Design encourages high-performance, non-residential building design and construction, and a variety of solutions to building owners and design teams. More information at: [savingsbydesign.com](http://savingsbydesign.com).



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