

Mutual Housing California Achieves Zero Net Energy in Woodland



Mutual Housing at Spring Lake in Woodland, California. (Photo credit: Mutual Housing)

When Mutual Housing at Spring Lake opened its doors in March, the 62-unit apartment development became the first multifamily affordable rental development in the nation to receive the [U.S. Department of Energy's Zero Energy Ready Homes](#) certification. Zero Net Energy (ZNE) buildings produce as much energy as they use through the integration of energy efficient design and renewable energy generation. Mutual Housing at Spring Lake reached between 36.5% and 40.8% above 2008 Title 24 Code across its six buildings. The property is also expected to see a 40% reduction in water use and related costs compared to simply code-compliant residences.

The original motivation for pursuing ZNE was to increase Spring Lake's competitiveness for [United States Department Agriculture Rural Development \(USDA-RD\)](#) funding, which encourages a ZNE approach. The USDA 514 program awards extra points to developers who generate energy on-site by "using technology to lessen the property's need for outside energy sources" (USDA 2013). A development receives points for energy generation of 10% or more, and points increase as the energy generation percentage increases. By committing to 100% ZNE, [Mutual Housing California](#) maximized USDA points and received \$5.5 million in permanent funding from USDA.

"Mutual Housing is always on the cutting edge of incorporating sustainability into their developments," said Laura Kobler, Director, Sacramento Region, at the [California Housing Partnership Corporation \(CHPC\)](#) who assisted with the financing of Spring Lake. "Spring Lake provides a case study for other developers who want to pursue zero net energy projects."

Spring Lake Property Snapshot

- 62 units of agricultural work housing (a range of 700-1500 square feet per unit)
- 5 residential buildings and a community building
- Central laundry
- Community gardens
- Tracking energy usage with WegoWise

Moving toward Zero Net Energy

Vanessa Guerra, Project Manager at Mutual Housing California, had reservations before deciding to pursue a 100% ZNE development. One of her major concerns was cost: overall construction costs for the extensive solar

array and other upgrades necessary to achieve ZNE at Spring Lake were nine (9%) percent higher than for meeting 2008 Title 24 Code. However, Guerra realized that these features would more than pay for themselves by making it possible to obtain the \$5.5 million USDA financing while also dramatically lowering owner and tenant utility bills. Altogether, the ZNE features resulted in \$1.2 million in incremental costs above code. Over the first 15 years, however, the property will collect between \$1.3 million and \$1.7 million of additional rent just from increased net rents as a result of lower utility allowances. Further, the ZNE features also increased competitiveness in applying for Low Income Housing Tax Credits.

Summary of sources and uses for Spring Lake:

SOURCES	Permanent
USDA Section 514 Farmworker Housing Loan	\$5,500,000
Citibank Section 521 Rental Subsidy Increment Loan	\$1,245,000
Joe Serna Farmworker Housing Grant (Residual Receipts Loan)	\$1,000,000
City of Woodland (Residual Receipts Loan)	\$910,000
Wells Fargo Purchase of Business Energy Investment Tax Credits	\$181,527
Wells Fargo Bank Purchase of Low Income Housing Tax Credits	\$13,243,336
TOTAL	\$22,079,863

USES	Permanent
Construction	\$13,755,708
Local Development Impact Fees	\$2,988,925
Land/Acquisition	\$1,465,382
Financing and Other Soft Costs	\$1,529,999
Photovoltaic system	\$637,000
Design, Engineering, Local Permits	\$708,849
Development Fee	\$994,000
TOTAL	\$22,079,863

The Secret to Achieving Zero Net Energy

Sean Armstrong, Building Scientist and Project Manager at Redwood Energy, summarized what it takes to get Spring Lake or similar developments to ZNE:

- 1. A true ZNE building does not use natural gas** as an energy source because natural gas consumption cannot be directly offset with on-site renewables.
- 2. Hot water and laundry matter most.** According to [one study](#), residents wash approximately 40% less loads of laundry if they use a community laundry facility rather than having in-unit facilities. Similarly, large efficiency gains can be achieved by installing electric hot water tanks, which can cost \$1,000 less per unit than on-demand gas water heaters.

- 3. Invest in ENERGY STAR appliances.** Buying ENERGY STAR appliances for all purchases (HVAC, domestic hot water, windows, appliances) has a consistent positive return on investment when investing in solar.

Mutual Housing at Spring Lake Green Certifications:

- Department of Energy Zero Energy Ready Home
- LEED for Homes Platinum
- Enterprise Green Communities
- ENERGY STAR Certified New Homes Version 3

Energy and water efficiency features at Spring Lake

“Once we decided we were going to pursue a zero-net energy project, there was a learning curve in actually getting ourselves there,” said Guerra. “It was great to work with a contractor and an architect who were both committed to helping us achieve our goals for the project.” Working with the ZNE team led by Armstrong, the development team agreed on the following to get to ZNE while staying within a reasonable budget:

- **Heat Pump:** Mutual Housing at Spring Lake used an innovative electric heat pump to supply domestic hot water and hydronic heating and cooling. Each heat pump has a compressor, heat exchange, and water storage tank. At the time this system was chosen it was the favored model, but in the short time since Spring Lake was planned, efficiency and costs for heat pumps have improved greatly; a development today could budget \$3,000-4,000 less per unit.
- **209 Kilowatt Photovoltaic System:** Sized at 3.3kW of PV per unit, the photovoltaic system offsets the entire electrical load for the property at a cost of \$11,000 per unit after [New Solar Homes Partnership rebates](#).
- **LED lighting:** Two-thirds of all lighting on the property are high performance LED bulbs that use one-third less energy than compact fluorescents.
 - **Tenant Energy Usage Monitors:** All residents learn about their energy budget through a color-coded meter in their kitchen. The light changes from green, yellow, red, then fuchsia as the household uses up the daily solar budget. If the resident stops when their daily use is in the red, they will have no monthly energy costs above a \$5 administrative fee for electricity. Initial savings results are promising.
 - **Water-Saving Showerheads:** Each unit is equipped with a thermostatic valve showerhead—a 1.5 gallons-per-minute high-efficiency showerhead that automatically restricts the flow of water to a trickle when the water reaches the appropriate temperature, until the resident pulls on a tab to resume normal water flow. Such showerheads have been shown on average to reduce hot water usage by one minute per shower.
- **Drought Tolerant Landscaping:** The landscaping includes a variety of native and drought-tolerant plants. The fruit trees on the property were planted at a greater depth, with an underground irrigation system, to reduce the water demands by more than half.



The Impact of Zero Net Energy on Utility Allowances

All utility systems at Spring Lake are electric and there are no gas bills involved. Residents pay for electricity, but if their usage stays within the modeled range, they only pay the \$5 administrative fee. This allows each unit’s utility allowance to be set between \$6 and \$12 based on the California Utility Allowance Calculator (CUAC) for a property with these zero net energy features, compared to \$94-\$227 based on the standard Utility Allowances (UA) for Yolo County as determined by the Housing Authority (HA).

Spring Lake Utility Allowances by Unit Type	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom
Unit Count	12	20	22	8
Spring Lake--ZNE CUAC	\$6	\$6	\$13	\$12
Yolo County HA -all electric UA	\$114	\$142	\$184	\$227
Yolo County HA--Gas Cooking, HVAC, Water Heating, electric lighting, and plug loads	\$94	\$114	\$143	\$172

As funding opportunities and state policies continue to encourage a ZNE development approach, Mutual Housing at Spring Lake provides an important example for the multifamily affordable housing sector. Beyond simply achieving sustainability goals, ZNE has the potential to improve the lives of residents. “This is a project

for farmworker families, a demographic that is very often exposed to unhealthy environments, and who will benefit both physically and financially from these sustainable homes. Mutual Housing at Spring Lake exemplifies our mission of bridging the green divide for low-income renters,” said Guerra.

California’s Policies and Programs Promoting the Expansion of ZNE

- **[2015 California Tax Credit Allocation Committee \(TCAC\) Regulations](#)**: While not the case when Mutual Housing California applied for tax credits, TCAC regulations now allow developers to measure energy efficiency gains as a percentage of ZNE rather than in excess of Title 24. The more a building offsets tenants loads, the more points a development receives.
- **[2013 Integrated Energy Policy Report](#)**: California set the goal of making all new buildings zero-net-energy by 2020 for homes and 2030 for businesses. The Integrated Energy Policy Report (IEPR) outlines the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) policy and programmatic commitments to ZNE.
- **[The Global Warming Solutions Act of 2006 \(AB 32\)](#)**: This bill set California on a trajectory toward exploring options for reducing green house gas emissions (GHG) by improving energy efficiency, expanding the use of renewable energy resources, encouraging cleaner transportation, and reducing waste. To that end, encouraging ZNE in commercial and residential properties has become one mechanism to reach the state’s goals.

Want more information about Mutual Housing at Spring Lake? Please contact Vanessa Guerra, Project Manager at Mutual Housing California: Vanessa@mutualhousing.com.

Want more information on GREEN?

The GREEN Network is a collaborative effort by stakeholders to make energy retrofit funding available to federally assisted low-income rental apartments that serve our state’s lowest-income residents. To learn more, please contact Caroline McCormack at cmccormack@chpc.net, 415-433-6804 x313.

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