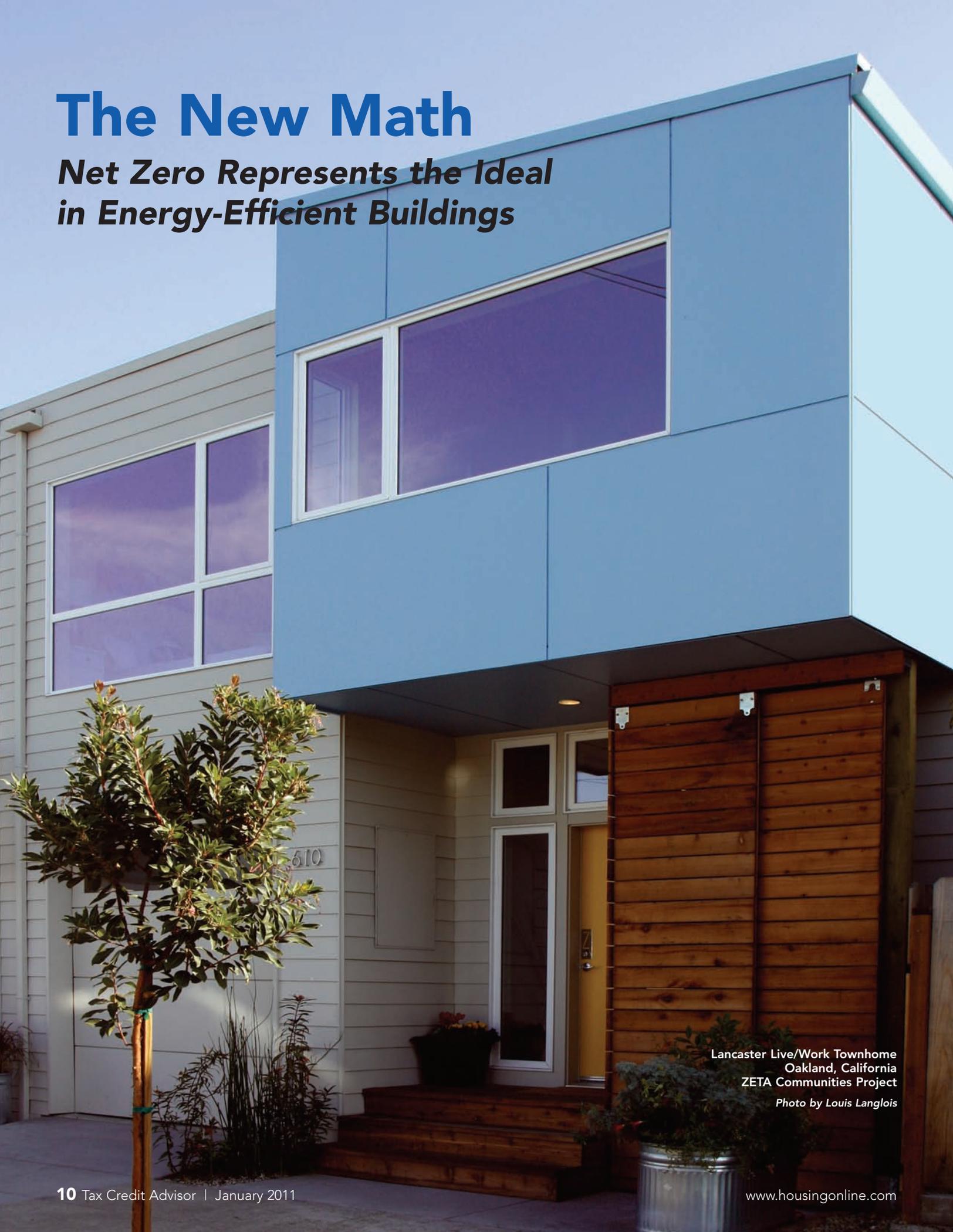


# The New Math

***Net Zero Represents the Ideal  
in Energy-Efficient Buildings***



Lancaster Live/Work Townhome  
Oakland, California  
ZETA Communities Project

*Photo by Louis Langlois*

Some developers are putting the pedal to the metal when it comes to green building – aiming for “net zero” in designing and constructing new affordable multifamily housing projects.

Many new buildings today meet one or more green building rating standards, such as the LEED systems of the U.S. Green Building Council, or the Green Communities criteria of Enterprise Community Partners designed for affordable single-family and multifamily housing projects.

Net zero buildings stretch further, producing as much or more energy as consumed during the year. This happens by reducing a building’s energy needs as much as possible by making it more energy efficient, and then generating electricity on-site from a renewable energy source to cover the building’s remaining energy “load.” While there may be periods of time when the project draws power from the utility grid, this amount is matched or exceeded in the course of a year by the electricity produced on site.

Benefits of net zero building include lower utility costs and a hedge against future utility rate hikes; greater sustainability; and even marketing advantages. Achieving net zero is more realistic for new construction than it is in retrofits of existing buildings but some of the latter is also being tried.

Experts say the most important step in going net zero is to develop the correct design upfront – to maximize energy efficiency within the project’s budget and avoid costly construction change orders.

### Integrated Design Important

Enterprise encourages the use of “integrated design” for projects seeking certification under its Green Communities program. Here the different participants in a proposed green housing project – developer, architect, engineer, energy consultant, contractor, utility company, etc. – huddle at the front end to discuss options and costs and hash out collective design decisions.

“To accomplish net energy design begins with a focus on the integrated design process,” says Enterprise’s Trisha Miller, Director, Green Communities.

“[This means] looking at some of the lower-cost items that can achieve higher energy and building performance, like solar design, solar orientation, taking advan-



Trisha Miller

Photo by Enterprise  
Community Partners

tage of passive solar in the way buildings are oriented on the site. And then focusing on the mechanical and electrical systems to the building envelope, ensuring that the building is tight and will only use the amount of energy that’s needed to support all of the affordable housing units on that site.”

She adds, “We see net zero as a laudable goal, and certainly the direction that the industry is evolving towards.”



Heather Clark

Steps that can be taken to reduce a building’s energy load – compared to a conventionally built structure – start with making the building envelope as tight as possible, such as by using windows and insulation with a higher R-value rating, and by air sealing around openings in walls where heat can be gained or lost. Additional steps, says energy consultant Heather Clark, of Biome Studio, include high-efficiency appliances (e.g., Energy Star-rated) and high-efficiency lighting (e.g. LED lights). Photovoltaic solar can also power lighting systems. Also, equipment that reduces water usage (e.g., low-flow toilets and water fixtures) can reduce energy bills as well as water costs.

A super efficient envelope reduces the building’s energy load, which then permits a smaller, high-efficiency mechanical system to provide heating and cooling, further cutting the energy load.

The final component is adding equipment to tap renewable energy (e.g., solar, wind, geothermal) to produce electricity for the building, supplementing the tie-in to the grid. The most popular choice has been solar photovoltaic (PV) systems to produce electricity (sometimes also with solar thermal to provide hot water). Reasons include: more sites are suitable for solar than other renewable sources; there is greater ease in getting local permits; and there is wider availability of federal, state, and utility tax credits, rebates, and other incentives to help cover the cost.

For instance, the federal investment tax credit can be claimed for 30% of the purchase/installation cost of a solar system, and there are also state tax credits or utility rebates in some states. If installed as part of a new low-income housing tax credit (LIHTC) project, federal housing credits may be claimed on the solar equipment as well, provided certain conditions are met.

There are also various federal, state, local, and utility

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incentives to subsidize the costs of other kinds of energy-efficient equipment and measures. Miller advises developers to reach out to their local utility company to find out what is available. *(For a comprehensive directory of federal, state, and utility energy/green incentives, visit <http://www.dsireusa.org>.)*

Enterprise also has a Carbon Offset Fund that purchases carbon credits from qualifying projects that reduce carbon emissions, providing another source of equity.

Clark estimates that in general it requires reducing the energy load of a building by at least 80 percent from conventional levels to power it entirely from renewable energy.

### Austin Net Zero Project

In Austin, Texas, the Guadalupe Neighborhood Development Corporation (GNDC), a local nonprofit, is developing its first net zero housing project with the help of a consultant, the Austin Community Design and Development Center (ACDDC). The Center, a technical assistance provider for Enterprise Green Communities, is the sustainable design consultant and is providing project management services.

The net zero project will be on a vacant, seven-acre tract zoned for multifamily housing that is part of the larger new Guadalupe-Saldana housing subdivision, and will consist of 60 housing units (28 rental, 32 homeownership) in detached single-family houses, duplexes, and townhomes. The subdivision will also contain 30 for-sale homes with the same mix of structures developed by GNDC on a separate four-acre tract.

Housing units will range from one to five bedrooms. Construction on the \$20 million subdivision project, designed to meet the Enterprise Green Communities criteria, could start early this year.

GNDC Executive Director Mark Rogers decided to try developing net zero housing for the first time in response to an offer made by Austin Energy, the local electric utility. The company offered to donate the solar panels for the project (for solar PV/thermal), provided the homes are 54% more efficient than the current local energy code.

According to ACDDC Executive Director Michael Gatto, a solar PV array will be installed on the roof of each structure to supply electricity. Each will be net metered, so that when the home is not consuming all

of the electricity being produced, the excess will flow into the utility grid. This will give residents credits that reduce their electric bill from the utility.

The rental units will be leased to those from extremely low-income up to 60% of the area median income; the cap for home buyers will be 80%. According to Rogers, GNDC will probably create a community land trust to own and lease the land beneath the development on the multifamily site to ensure long-term affordability of the housing units.

GNDC hasn't yet lined up all of the financing for the subdivision project, but isn't planning to use housing credits. So far, it has received grants from Enterprise Green Communities and the Kresge Foundation, and acquired some of the land and covered much of its pre-development costs using local general obligation bond proceeds. It paid for the seven-acre site from its own funds.

### Modular Units

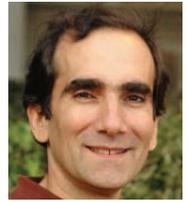
In California, a San Francisco-based company, ZETA Communities, is helping developers, cities, and other clients put up net zero buildings in a different and more economical way, including multifamily rental housing properties.

The firm manufactures, sells, and assembles modular units that have been used to build single-family homes, multifamily housing, and schools. It also provides project management and can help with project design.

The company was founded in 2007 with the goal "to scale net zero energy construction to a national level" and make it more cost-effective, says Shilpa Sankaran, Co-Founder and Vice President of Marketing.

The company produces its modular units, which meet state and local building codes, in a factory. The modules are then transported to the project site, where they are assembled. Each one-bedroom housing unit typically requires four modules; multifamily buildings with corridors have modules spanning the hallway and part of the two facing housing units. Buildings can be as tall as five stories.

Andrew Silverman, also of ZETA Communities, says buildings constructed of the modular units use 40 to 60 percent less energy than a conventional building.



Michael Gatto



Shilpa Sankaran

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# THINK



# RETHINK

## **THINK GREEN COMMUNITIES CAN'T BE AFFORDABLE? THINK AGAIN.**

Enterprise has proven that green methods and materials can significantly raise operating revenues by lowering energy and water consumption. Building green also cuts greenhouse gas emissions and improves transit access, creating healthier homes in pedestrian-friendly places. Tools like the Enterprise Green Communities Funds make it possible.

**Enterprise is committed to making all affordable homes green by 2020. Are you in?**

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Asset Management | Housing Development | Capital Markets



[www.enterprisecommunity.org](http://www.enterprisecommunity.org)

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Construction is 50 to 70 percent faster and hard costs 7 to 17 percent less, he adds. As a result, the cost savings can be used to upgrade a building to net zero – by adding a solar PV system and other measures – for a total development cost not exceeding that of a conventional building. This excludes the future energy cost savings generated.

Sankaran and Silverman said the company's buildings are more energy efficient because of such things as a highly efficient building envelope (R-26 for its first two projects), windows (R-5 to R-7), and insulation, and high efficiency heating and cooling systems.

Solar has been the typically renewable energy



Andrew Silverman

source used so far in their buildings, which have all been in California. "One of the benefits in California of going with solar for multifamily affordable projects is the incentives offered to subsidize the solar," says Sankaran.

### Net Zero In the Future

Going forward, net zero is likely to be a growing trend in the green building field, not only for economic reasons, but because of government dictates, incentives, and nudging.

For instance, the city of Austin has established a goal that by 2015 all new single-family homes be at least net zero energy-capable – sufficiently energy efficient to achieve net zero if there is proper solar orientation and the owner could afford an on-site renewable energy system.

In Massachusetts, Gov. Patrick Deval has laid out an ambitious goal to increase the number of net zero buildings in the state, establishing a task force that has outlined a path for getting there.

Miller advises developers thinking about doing a net zero multifamily project to "take advantage of all of the opportunities in the affordable housing sector that are available to improve building performance, reduce energy demand, and create healthier living environments for low-income families. At this point we have federal and state programs that can enable us to be innovative in the way that we think about integrating solar and other renewable energy technologies in the development process. It's incumbent on all of us to raise the bar on energy environmental performance in affordable housing and look at the models like Guadalupe that are out there really paving the way." **TCA**

## People in the News

**Cash Gill**, of Gill Group, Inc., Dexter, Mo., has been appointed to the Missouri Real Estate Appraisers Commission, which certifies and licenses qualified persons engaged in the practice of real estate appraising within the state. Gill Group, Inc. is a company of nationwide valuation and market feasibility experts that have completed appraisals and market studies in all 50 states.

Tax Credit Asset Management, a Boston-based investment manager in the affordable housing industry, has announced the promotion of **Tracy McDermott** to Managing Director. In her new position, she will design and establish new engagements and coordinate delivery of client services, data systems, and reporting.

**Kevin Boes** has been named as President and CEO of the LISC New Markets Support Corporation (NMSC), effective January 1. NMSC is the new markets tax credit investment arm of the Local Initiatives Support Corporation (LISC), and is managed by LISC's tax credit syndication affiliate, National Equity Fund, Inc. (NEF). Boes currently serves as NEF's chief financial officer. **TCA**

### More Information

**Getting to Zero: Final Report of the Massachusetts Zero Net Energy Buildings Task Force, March 2009.**

[http://www.mass.gov/Eoeea/docs/eea/press/publications/zneb\\_taskforce\\_report.pdf](http://www.mass.gov/Eoeea/docs/eea/press/publications/zneb_taskforce_report.pdf)

**Enterprise Green Communities**

<http://www.greencommunitiesonline.org>

**ZETA Communities**

<http://www.zetacommunities.com>

**Wikipedia – Zero-Energy Building**

[http://en.wikipedia.org/wiki/Zero-energy\\_building](http://en.wikipedia.org/wiki/Zero-energy_building)