



Greenprints

by Vandana Sinha

Net-zero's new hip address

In Meditch Murphey's design, sustainability is the Holy Grail of a home, using common-sense features. When will others catch up?



Architect Marcie Meditch in front of her net-zero design. She wanted to show that if you build it, they will buy it. Her design for the 3,500-square-foot Bethesda home makes use of several relatively low-tech features.

MARCIE MEDITCH JUST wanted to show it could be done. And there on a Bethesda neighborhood's tree-guarded corner stands her otherwise unassuming evidence. It's a white four-bedroom house that resembles any other, but peel back the nontoxic drywall, and you'll discover one of the region's few examples of what could be architecture's next archetype.

The new development comes down to a mathematical equation: net-zero. These buildings produce as much energy, in the course of a year, as they consume. They often remain on the power grid, absorbing energy when they need it and returning excess energy when they produce too much. By year's end, the buildings presumably have zeroed themselves off the grid. Which, by definition, means it will take Meditch a year's worth of tracking the Bethesda home's electric meters to determine whether such a project is feasible – and whether net-zero is more than some one-hit wonder.

The crusade is catching on. An American Institute of Architects committee wants new construction by 2030 to meet net-zero standards. The even more ambitious U.S. Department of Energy aims to slap that standard on half the existing commercial building stock by 2040 and the rest by 2050. No one knows whether that timeline allows too many or too few years for net-zero to become the norm, but it's likely the goals alone will be enough to take architecture, engineering, construction and invention to new heights. "The codes are changing," said Meditch, who formed Meditch Murphey Architects Inc. with husband John Murphey. "That's the goal, that this is the standard practice and we don't need an incentive anymore."

Any architects in need of net-zero design inspiration should probably just pick up a copy of their parents' building code manuals. For all the futuristic technology driving this trend – daylight and motion sensors, geothermal heat pumps, advanced

ventilation controls, on-site alternative energy generators – it's amusing to see how much net-zero ends up navigating us back to those olden days before air conditioning was indispensable. Net-zero thinking has led to such brainstorming as opposing windows and doors for natural cross-ventilation. Placing windows in directions that face the sun. Outdoor awnings to protect a family room from hot solar glares. Right-sizing a home so it's not bigger than necessary. While the latter in particular may induce gasps from today's indulgent homebuyers, it's yet another example of how energy conservation has increasingly become an homage to bygone eras, minus the lead paint and asbestos (we're slowly getting there, Native Americans).

Still, the shift to net-zero is not without its unanswered questions. What are the sacrifices in everyday convenience for annual conservation? How can building owners make tenants and operators actually incorporate these smart designs that exist otherwise merely on paper and inside computerized models?

And there's a developer's favorite issue: price. With some already skittish at the cost of building green, will they shell out for net-zero? Architects optimistically argue yes. In addition to touting the environmental and societal benefits – imagine a country with less need for the kinds of coal mines that claimed 25 West Virginians last month – they say the monthly cost of low-to-no energy bills is too enticing to pass up. They also point to scores of available government rebates and tax credits.

Though, that also means those paying upfront bills for more complex construction and expensive solar panels will want a fast return on that investment – never a guarantee in the age of warp-speed commercial building turnover. "There's no question that the commercial sector is not set up in a way to give incentives for this," said David Bell, president of Bell Architects PC, pointing to new local initiatives that tie loans for energy-efficiency upgrades to property taxes as possible solutions. "The way things are structured financially would need to change."

To add to the conundrums, the DOE's nationwide database of net-zero commercial buildings – all of eight entries so far, half in California – doesn't seem to include projects that top two or three stories. The maximum footprint? A measly 13,600 square feet. So how to translate that to the incalculably larger office buildings – and offset the most gluttonous of energy hogs – that will make up the bulk of 2030's new construction? Feel free to insert your answer here because the industry's experts don't have one yet.

For Meditch, it began with 12,500 square feet of land topped by a deteriorating, decades-old home. Her firm bought the land for \$650,000 and built a speculative, four-bedroom, 3,500-square-foot home for \$1.2 million that finally sold amid the housing downturn last year for \$1.75 million. It boasts soy-based biodegradable foam insulation, tightly sealed walls and roof, energy-efficient lighting and appliances, low-flow plumbing fixtures, geography-specific ventilation gauges, a green roof and two 375-foot-deep geothermal wells to set the house's temperature baseline at 55 degrees. That lowered the house's overall energy cravings, while new 9.6-kilowatt solar panels on the roof hope to produce enough power to sate that reduced appetite.

Meditch, who had just wanted to show net-zero could be done, expects it to pay off in the next year's worth of Pepco bills. If she's right, she hopes more of her colleagues decide to show they could do it too. ☐

VANDANA SINHA is a senior staff reporter at the Washington Business Journal and can be reached at vsinha@bizjournals.com.

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