



**Function**

Converging Architectural + Performance Goals



## Hanson Home, Minneapolis

No 'Solar Ugly' here. SALA delivers an attractive and functional home composed of modern materials that help deliver not only a net-zero-certified home, but one that is comfortable and inspires others.



**Marc Slood, Associate, SALA Architects** plays a major role in keeping SALA on the cutting edge of green design by weaving his technical knowledge of design and construction with a wonderful sense of beauty.

Marc Slood has always been involved in sustainable design, and was a key player in helping bring Green-Star home certification to Minneapolis. His wish to build a net zero home was recently fulfilled, actually twice—once on a new home, and once on an addition/renovation—and he hopes these edifices are the first of many. The Hanson home, featured here, came to be based on a

relationship the architect had with a builder who delivered the perfect clients: Mark and Kate, who already owned electric vehicles, and wanted to lower their carbon footprint. The couple wished to live closer to the city's core, but finding the ideal site was tricky. Beyond a good southern exposure, Slood was hoping for a parcel that might have a small hillside to take better advantage of passive

solar heating opportunities. Alas, they were not able to accommodate the latter, but were able to somewhat manufacture what he was seeking. "The site had a lot of clay, so we didn't end up doing the slab-on-grade we originally envisioned for a more age-in-place-friendly structure. But because the foundation would have to be deep, we decided to include a lower level and construct a stone retaining

wall and terrace that acted as the hill we had hoped for."

Overhangs from the upper level also act as passive shading for the lower level. The sub-level also helped the home be more compact. If a home is long and thin, Slood explains, you'll need a lot of skin material compared to the ratio of usable floor space. Fenestration, too, has to be factored. Window sizing and

placement, in particular, took a great deal of consideration, with the majority of larger windows being placed on the south side to take advantage of passive solar. "In the kitchen area, they start smaller, but then get a little larger—it's really a progression that helps you read the house," says Slood.

Window placement also mirrors the horizontal lines of the siding, which

Slood says was important, as he was trying to balance performance with aesthetics. While they were shooting for net zero, neither Slood, or his clients, wanted a "solar ugly" home. "That doesn't do anyone any favors, and we want to design homes people are proud to live in, are comfortable and that they'll want to preserve," says the architect.

**FIBER-CEMENT PANELS**

Durability played a major role in the cladding decision. While it appears to be wood, it's actually fiber cement siding. "It really holds paint well, and is good against woodpeckers and birds," says Sloom.

The lap-sided look complements neighboring homes and helps it blend in. Horizontal lines, along with the blue paint, create a distinct band from the tan gables, which are accentuated with vertical lines to give it a board and batten look. Fiber cement also allowed SALA to implement a well-insulated rainscreen. "We looked at a number of options, but really put cost and performance at the forefront."

The system is composed of a double-stud 2x4 wall separated from each other with an 11.25-in.-thick cavity filled with cellulose Denspack insulation. The interior drywall is Certainteed's Air Renew to improve IAQ. The exterior is covered with a layer of plywood and Tyvek as the weather barrier, then Cor-A-Vent furring strips to create a vent cavity behind the siding. "When you do a thick wall like this, heat doesn't get through to dry the outer wall, so you need that cavity to dry out the wall," says Sloom.

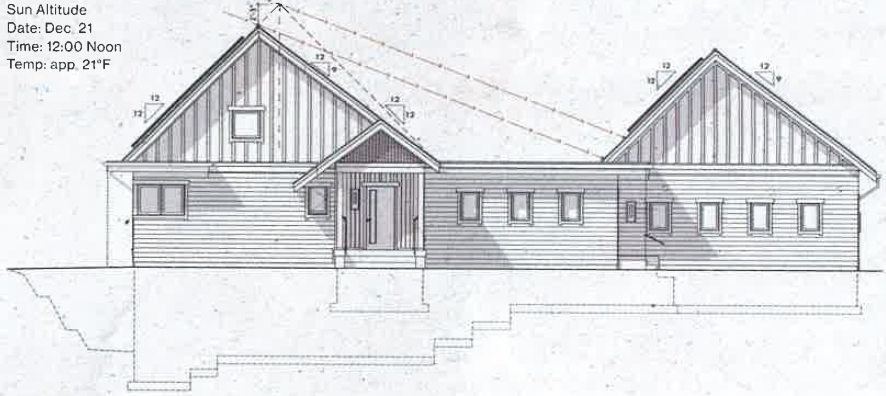


**FIBER-CEMENT PANELS**

**James Hardie**  
jameshardie.com

**The Roof and the Sun**

Sun Altitude  
Date: Dec 21  
Time: 12:00 Noon  
Temp: app. 21°F

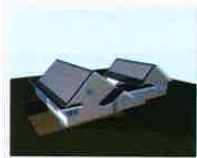
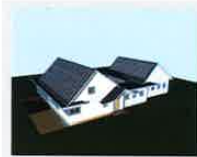


**ROOFING**

The standing seam roof, which carries 310W LG PV panels on both southern slopes, sets the tone for the home. A distinct feature is that both the home and garage roofs are asymmetrical. For the southern slope, Sloom decided on a 12-12 pitch at a 45-degree angle—the optimal PV angle in Minneapolis' northern climate. However, on the northern slope, the pitch is 9-12 so as not to create shading on the PV-clad garage. The architect chose standing seam, in large part to better accommodate the solar panels, but also to give the home a more clean and modern look, that's also durable and easier to maintain.



**GYPSUM**  
**Air Renew**  
certainteed.com



**THE MOVING SUN**

The images show modeling of daylight on the east and southern elevations of the home over the course of the year when the sun is at significantly different angles. Overhangs were strategically placed to block the higher angle of the summer sun, while fully letting in lower angled sun in the winter. As far as the PV, Sloom investigated a number of options, including more low-key "shingle"-style offerings. However, due to the load expected to charge the cars, and the fact that the shingle-style panels don't offer the same efficiency as traditional PV panels, he opted for the latter. Longevity was also a concern, but so was product experience. "I wanted something more tried and true and it's an all-electric house, so we needed to maximize it."

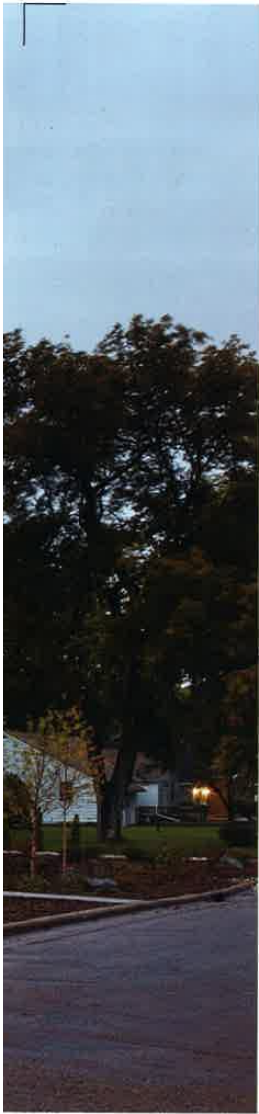


**SOLAR PANELS**  
**LG**  
www.lg.com

Sloom also considered solar thermal, but similarly opted against it, as it began to add too much complexity, and raised aesthetic issues.

**"The clients wanted to move the net-zero needle to show it could be done, look good, and not be too costly to build. They really wanted to inspire others."**

— Marc Sloom, AIA, Greenstar Professional, SALA



Photos: Corey Gaffer, courtesy SALA



**PROJECT SPECS**

- Project:** Ohm Sweet Ohm
- Construction:** Hage Homes
- Landscape Design and Installation:** Southview Design
- Interior Design:** Liliu Interiors
- Structural Engineering:** Align Structural
- Mechanical Design and Installation:** Massmann Geothermal and Mechanical
- Electrical:** Verdant Electric
- Photovoltaic Array Design and Installation:** Innovative Power Systems



### LOCALLY SOURCED

Fenestration plays a big role with a mix of window sizes, some operable, but mostly fixed. Sloot ended up choosing Andersen windows for a number of reasons, not the least of which was good timing. "Andersen had just come out with a triple-pane A-Series window." Sloot had done some prior aesthetic design consultation work with the company, having helped the manufacturer when it was developing a previous generation of the A-Series product line. The fact that the company was local, and that the products were off-the-shelf available, sealed the deal. "On many passive houses, they're using windows from Europe, but we didn't think that was going to work as far as the budget was concerned." At the same time, the windows did come in a number of finish options and colors. For example, on the Hanson home, the windows are in pine with more contemporary hardware. However, on Sloot's other net-zero home—a retrofit and expansion of a Victorian—Sloot was able to get windows in a pre-finished maple wood species with a standard Queen Anne grill to keep the aesthetic of the more traditional home.



**"First and foremost, have a good team. Also set expectations with the client up front. Finally, don't be afraid—embrace that it can be done."**

—Marc Sloot, AIA, Greenstar Professional, SALA

### COST AND AESTHETICS

As far as "expense," Sloot is quick to point out that triple-pane windows will pay for themselves. "Perhaps it's more indirect, but you'll end up with a much more comfortable environment, no condensation and better humidity levels, which means better IAQ and health." People in the neighborhood have responded well to the home, and it's even generated possible new business, which is certainly a relief. In fact, it's kind of ironic in that Sloot noted they did find their ideal site early in the process, but a developer declined to sell the property due to concerns about what a net-zero home might look like. "The home is on several tours, and we've seen an uptick in inquiries," said Sloot. "You just have to embrace it and know that it can be done."

### HVAC

The home employs an usual system composed of a ground source heat pump (GeoComfort) in-floor radiant and a forced air system. "Because Minnesota is the land of '10,000 extremes,'" we used a hybrid system. In the shoulder months, it gives us more flexibility for optimal indoor temperature control and comfort.



### INTERIORS

Interior materials were thoroughly thought through and mostly of a more eco-nature, including veneers made from engineered wood. "We brought in an interior designer who helped us meet our sustainability goals, and I'm pleased the home has very low VOCs." The lighting used was all LED.



### Victorian Goes 21st Century

Sloot's other net-zero project is also in Minneapolis, the Herman home. It, however, was completely different experience, as it

involved an addition and retrofit to a classic Victorian on a very tight site. "We opened the house to create better circulation, add daylight and double the size of the kitchen," said Sloot.

The project involved major envelope improvements, including a significant increase in insulation (spray foam polyiso), replacing saw dust in some instances. The team even excavated around parts of the foundation to add insulation in critical spots, but they didn't stop there. At the top, the roof was raised, and another 10 in. of insulation was added, giv-

ing the roof an R80 value, and the walls, ultimately, an R40. Better windows, of course, were also part of the envelope/daylighting plan, and Sloot, again, worked with Andersen. This time, however, opposed to the more modern look of the Hanson home, he wanted a more classic look to fit the nature of the Victorian. With budget, as always, a concern, Sloot said the manufacturer was able to offer standard and available, high-performing double-hung windows in a darker maple, but also in a Queen Anne style in line with the home's aesthetic.

"This meant we didn't have to go overboard with customization," said Sloot, as the budget wasn't blown. More importantly it allowed the clients, the Herman's, to achieve an important goal. "They wanted to move the needle to show net zero can be done; that it not look bad or cost too much. They wanted to inspire others."

The pair of homes may have done just that, as Sloot reports SALA is investigating a possible four-home net-zero project for a local not-for-profit organization.

